

Benjamin R. Betzler Ph.D.

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SUMMARY

Outcome-focused reactor physics nuclear engineer with demonstrated experience and performance on successful research and development (R&D) projects for a variety of sponsors, including the Department of Energy Office of Nuclear Energy (DOE-NE) and the National Nuclear Security Administration (NNSA). Experience collaborating with diverse multi-organization teams and communicating with sponsors and staff. Recognized expertise in both methods development and reactor analysis, with specialized knowledge of Monte Carlo radiation transport methods, advanced reactor systems, and light water reactor (LWR) modeling and simulation.

EDUCATION

University of Michigan, Ann Arbor, MI
2014, Ph.D., Nuclear Engineering and Radiological Sciences (Fission)
Dissertation title: *Calculating Alpha Eigenvalues and Eigenfunctions with a Markov Transition Rate Matrix Monte Carlo Method*
Advisor: William R. Martin

University of Michigan, Ann Arbor, MI
2010, M.S.E., Nuclear Engineering and Radiological Sciences

University of Michigan, Ann Arbor, MI
2008, B.S.E., Nuclear Engineering and Radiological Sciences

RESEARCH INTERESTS

Numerical methods for solving neutron transport problems: Monte Carlo transport, α -eigenvalue methods, methods for solving time-dependent problems, and matrix methods and applications of Markov processes. Analysis and methods development for advanced reactors: molten salt reactors, high-temperature gas-cooled reactors, nuclear thermal propulsion, fast burst reactor systems, and accelerator-driven subcritical systems.

RESEARCH EXPERIENCE

Oak Ridge National Laboratory, May 2014 – present
Associate R&D Staff, May 2016 – present
Supervisor: Stephen M. Bowman, Group Leader, Reactor Physics

- o Coordinated the the modeling and simulation effort of the DOE-NE MSR Program, supporting dose estimation, dynamic modeling, and chemistry modeling efforts.
- o Developed molten salt reactor neutronics and fuel cycle analysis tools for the SCALE code package, leading the integration in ORIGEN, NEWT, and TRITON.
- o Developed design optimization tools and performed design studies of a High Flux Isotope Reactor (HFIR) LEU core with the Shift Monte Carlo tool.
- o Collaborated with Transatomic Power to perform neutronic and fuel cycle analysis and design optimization for their molten salt reactor design.
- o Performed depletion and criticality analysis of boiling water reactor (BWR) spent fuel assemblies for BWR burnup credit analysis.

RESEARCH
EXPERIENCE
(CONTINUED)**Oak Ridge National Laboratory (*continued*)**, May 2014 – present*Postdoctoral Research Associate*, May 2014 – Apr. 2016

Supervisor: Stephen M. Bowman, Group Leader, Reactor Physics

- Performed core design and analysis of a fluoride salt-cooled advanced demonstration reactor concept using Serpent and PARCS.
- Developed tools and performed neutronic analysis for fast and thermal spectrum molten salt reactors to characterize them for the fuel cycle options campaign.
- Designed a small nuclear rocket engine using accident tolerant fuel in KENO and performed optimization studies on packing fractions, fuel loads, and core geometry.
- Performed depletion simulation, neutronic analysis, and developed Python scripts in support of the HFIR LEU conversion project and HFIR operations.
- Tested the depletion and lattice physics performance of SCALE modules (TRITON, Polaris, NEWT, and KENO) for LWR geometries.
- Developed a Python script and built TRITON inputs to automatically generate the 1,470 ORIGEN cross section libraries released with updated versions of SCALE.

University of Michigan, *Research Assistant*, Aug. 2008 – Apr. 2014

Advisor: William R. Martin, Professor

- Simulated the Fort St. Vrain (FSV) gas-cooled reactor with MCNP, using RELAP5 to analyze thermal feedback. Wrote Python scripts for writing and updating MCNP and RELAP5 inputs.
- Modeled ~20 FSV pulsed neutron and other startup experiments with MCNP and performed sensitivity studies on design parameter uncertainties.

Los Alamos National Laboratory, *Research Assistant*, Summer 2012

Advisor: Dr. Brian Kiedrowski, Research Scientist, X Division

- Wrote a research Monte Carlo code in MATLAB to calculate α eigenvalues and eigenfunctions of infinite media using a transition rate matrix method akin to the fission matrix method. This method improves upon the k - α iteration in MCNP.

Oak Ridge National Laboratory, *Research Assistant (NESLS)*, Summer 2010

Mentor: Daniel L. Pinkston, Nuclear Engineer, High Flux Isotope Reactor

- Calculated heat deposited in the HFIR reactivity control system with MCNP to investigate causes of control cylinder clad corrosion, spalling, and failure.
- Analyzed the burnup of control cylinder absorbers and cladding with ORIGEN and determined the axial heat flux distribution with simple heat transfer models.

FUNDING
AWARDS &
ROLES**Fundamental Studies of Materials Degradation in Molten Chloride Salts**, 2017 – 20*Oak Ridge National Laboratory LDRD*

Principal Investigator: S. S. Raiman

With: J. W. McMurray, C. W. Abney, R. T. Mayes, J. R. Keiser, **B. R. Betzler****Molten Salt Reactor Neutronics Tools**, 2016*Department of Energy (DOE) Technology Commercialization Fund*, \$300,000Principal Investigator: **B. R. Betzler**

With: J. J. Powers, N. R. Brown, and B. T. Rearden

Optimization and Assessment of the Neutronics and Fuel Cycle Performance of the Transatomic Power Molten Salt Reactor Design, 2016*Gateway for Accelerated Innovation in Nuclear (GAIN)*, DOE Office of Nuclear Energy NE Voucher Program Request for Assistance, \$200,000

Principal Investigator: L. C. Dewan (CEO, Transatomic Power Corporation)

With: **B. R. Betzler**, J. J. Powers, and A. Worrall

PROFESSIONAL
AFFILIATIONS &
SERVICE

American Nuclear Society, 2013 – present

Oak Ridge/Knoxville American Nuclear Society, 2015 – present

Chair, 2017 – present

Vice Chair, 2016 – 2017

Secretary, 2015 – 2016

Conference Organization Activities, 2015 – present

Treasurer, International High-Level Radioactive Waste Management (IHLRWM), 2019

Session Chair, Fast Reactors and Molten Salt Reactors, GLOBAL, 2017

Session Chair, Reactor Physics, Mathematics & Computation (M&C), 2015

Editorial and Review Activities, 2016 – present

Reviewer, Nuclear Engineering and Design, 2016 – present

TEACHING
EXPERIENCE

Oak Ridge National Laboratory

SCALE Training Team Member, Aug. 2015 – present

- Lectured for SCALE workshop at M&C 2017 (~20 students).
- Lectured for week-long SCALE Reactor Physics courses to colleagues in academia and industry (5 courses with ~10 students per course).

Research Mentor, May 2015 – present

- Co-advised graduate research assistant (I. Variansyah) on MCNP modeling and Shift depletion simulation for the HFIR LEU Conversion Project (2017).
- Advised two undergraduate U.S. Navy Midshipman Bowman Scholars (J. R. Hedgecoth and B. M. Kaufmann) on modeling and simulation of pebble-bed high temperature molten salt reactors (2017).
- Advised undergraduate U.S. Navy Midshipman Bowman Scholar (Z. G. Skirpan) on fuel cycle modeling and simulation for the molten salt breeder reactor (2017).
- Co-advised graduate research assistant (Ł. Koszuk) on automating the generation of cross section library group structures for advanced reactor systems (2016–2017).
- Co-advised graduate research assistant (A. Abou Jaoude) on MCNP modeling and VESTA depletion simulations for the HFIR LEU Conversion Project (2015).

University of Michigan

Guest Lecturer, Fall 2013

- Taught several guest classes for senior-level nuclear reactor theory (~35 students).

Graduate Student Instructor, Fall 2012

- Graded, held office hours, and lectured several classes for senior-level nuclear reactor theory (~35 students).

Research Mentor, Fall 2010 – Fall 2012

- Mentored two undergraduate students (T. P. Burke and W. N. Pappo) on data analysis and MCNP modeling for the Fort St. Vrain reactor benchmark project.

Relevant Coursework

- Graduate level course in teaching engineering at a university level, Fall 2012.

AWARDS	<p>Best Team Paper, 2015 MeV Summer School <i>Future Experimentation: Sensitivity Analysis and Uncertainty Quantification to Optimize Design and Implementation</i></p> <p>Best Paper in Reactor Physics, 2010 ANS Student Conference <i>MCNP5 Analysis of the Fort St. Vain High-Temperature Gas-Cooled Reactor</i></p> <p>ANS Student Design Competition Finalist, 2010 <i>Irradiation of Food Using Spent Nuclear Fuel</i></p> <p>Kikuchi Scholarship, 2006 <i>Merit-based Scholarship</i></p>
SKILLS	<p>Environments: Mac, Linux, Windows</p> <p>Programming Languages: working knowledge of Python and Fortran, basic knowledge of C++, Java, HTML, JavaScript, and Perl</p> <p>Transport Software: MCNP, SCALE (KENO, TRITON, NEWT, ORIGEN, Polaris), Shift, VESTA, Serpent, OpenMC, GenPMAXS, PARCS</p> <p>Documentation & Analysis: \LaTeX, gnuplot, MATLAB/Octave, MS Office</p>
PUBLICATIONS SUMMARY & LISTING	<p>Author or coauthor of 7 peer-reviewed journal articles (5 first author, 1 submitted)</p> <p>Author or coauthor of over 25 conference proceedings and summaries</p> <p>Over 20 presentations[†] at conferences (12), meetings, and universities</p> <p>Author or coauthor of over 15 technical reports</p> <p>View publications at ResearchGate or Google Scholar</p>

JOURNAL ARTICLES

52. **B. R. Betzler**, B. C. Kiedrowski, W. R. Martin, and F. B. Brown, "Calculating α Eigenvalues and Eigenfunctions with a Markov Transition Rate Matrix Monte Carlo Method," (in preparation).
51. **B. R. Betzler**, S. Robertson, E. E. Davidson (née Sunny), J. J. Powers, A. Worrall, L. Dewan, and M. Massie, "Fuel Cycle and Neutronic Performance of a Spectral Shift Molten Salt Reactor Design," *Annals of Nuclear Energy*, (submitted).
50. E. E. Davidson (née Sunny), **B. R. Betzler**, D. Chandler, and G. Ilas, "Heat Deposition Analysis for the High Flux Isotope Reactor's HEU and LEU Core Models," *Nuclear Engineering and Design*, **322**, pp. 563–576 (2017).
49. **B. R. Betzler**, D. Chandler, E. E. Davidson (née Sunny), and G. Ilas, "High Fidelity Modeling and Simulation for a High Flux Isotope Reactor Low-Enriched Uranium Core Design," *Nuclear Science and Engineering*, **187**(1), pp. 81–99 (2017).
48. A. L. Qualls, **B. R. Betzler**, N. R. Brown, J. J. Carbajo, M. S. Greenwood, R. E. Hale, T. J. Harrison, J. J. Powers, K. R. Robb, J. W. Terrell, A. J. Wysocki, J. C. Gehin, and A. Worrall, "Pre-Conceptual Design of a Fluoride High Temperature Salt-Cooled Engineering Demonstration Reactor: Motivation and Overview," *Annals of Nuclear Energy*, **107**, pp. 144–155 (2017).
47. N. R. Brown, **B. R. Betzler**, J. J. Carbajo, A. J. Wysocki, M. S. Greenwood, C. A. Gentry, and A. L. Qualls, "Pre-Conceptual Design of a Fluoride High Temperature Salt-Cooled Engineering Demonstration Reactor: Core Design and Safety Analysis," *Annals of Nuclear Energy*, **103**, pp. 49–59 (2017).
46. **B. R. Betzler**, J. J. Powers, and A. Worrall, "Molten Salt Reactor and Fuel Cycle Modeling and Simulation with SCALE," *Annals of Nuclear Energy*, **101**, pp. 489–503 (2017).
45. **B. R. Betzler**, B. C. Kiedrowski, F. B. Brown, and W. R. Martin, "Calculating Infinite-medium α -eigenvalue Spectra with Monte Carlo using a Transition Rate Matrix Method," *Nuclear Engineering and Design*, **295**, pp. 639–644 (2015).

44. **B. R. Betzler**, W. R. Martin, B. C. Kiedrowski, and F. B. Brown, “Calculating α Eigenvalues of One-Dimensional Media with Monte Carlo,” *Journal of Computational and Theoretical Transport*, **43**(1-7), pp. 38–49 (2014).

FULL CONFERENCE PAPERS

43. **B. R. Betzler**, D. Chandler, D. H. Cook, E. E. Davidson (née Sunny), and G. Ilas, “High Flux Isotope Reactor Low-Enriched Uranium Core Design Optimization Studies,” *PHYSOR 2018 – Reactor Physics Paving the Way Towards More Efficient Systems*, (submitted).
42. D. Chandler, **B. R. Betzler**, D. H. Cook, G. Ilas, and D. G. Renfro, “Neutronic and Thermal-Hydraulic Feasibility Studies for High Flux Isotope Reactor Conversion to Low-Enriched Uranium U_3Si_2 -Al Fuel,” *PHYSOR 2018 – Reactor Physics Paving the Way Towards More Efficient Systems*, (submitted).
41. U. Mertyurek, **B. R. Betzler**, M. A. Jessee, and S. M. Bowman, “SCALE 6.2 Reactor Physics Code Accuracy Assessment using ENDF/B-VII.1 Library,” *PHYSOR 2018 – Reactor Physics Paving the Way Towards More Efficient Systems*, (submitted).
40. **B. R. Betzler**, J. J. Powers, N. R. Brown, and B. T. Rearden, “Molten Salt Reactor Neutronics Tools in SCALE,” *Proc. M&C 2017 – International Conference on Mathematics & Computational Methods Applied to Nuclear Science and Engineering*, Jeju, Korea, Apr. 16–20 (2017).[†]
39. B. T. Rearden, **B. R. Betzler**, M. A. Jessee, W. J. Marshall, U. Mertyurek, and M. L. Williams, “Accuracy and Runtime Improvements with SCALE 6.2,” *Proc. M&C 2017 – International Conference on Mathematics & Computational Methods Applied to Nuclear Science and Engineering*, Jeju, Korea, Apr. 16–20 (2017).
38. G. Ilas, **B. R. Betzler**, and B. J. Ade, “Study of the Impact of Operating Data on BWR Burnup Credit,” *Proc. PATRAM 2016 – The 18th International Symposium on the Packaging and Transportation of Radioactive Materials*, Kobe, Japan, Sep. 18–23 (2016).
37. **B. R. Betzler**, J. J. Powers, and A. Worrall, “Modeling and Simulation of the Start-Up of a Thorium-Based Molten Salt Reactor,” *Proc. PHYSOR 2016 – Unifying Theory and Experiments in the 21st Century*, Sun Valley, ID, USA, May 1–5 (2016).[†]
36. **B. R. Betzler** and J. J. Powers, “Fully Ceramic Microencapsulated Fuels for Space Reactor Applications,” *Proc. PHYSOR 2016 – Unifying Theory and Experiments in the 21st Century*, Sun Valley, ID, USA, May 1–5 (2016).[†]
35. E. E. Sunny, **B. R. Betzler**, G. Ilas, and D. Chandler, “High-Fidelity Heat Deposition Analysis for the High Flux Isotope Reactor,” *Proc. PHYSOR 2016 – Unifying Theory and Experiments in the 21st Century*, Sun Valley, ID, USA, May 1–5 (2016).
34. G. Ilas, **B. R. Betzler**, D. Chandler, and E. E. Sunny, “High Flux Isotope Reactor Core Analysis - Challenges and Recent Enhancements in Modeling and Simulation,” *Proc. PHYSOR 2016 – Unifying Theory and Experiments in the 21st Century*, Sun Valley, ID, USA, May 1–5 (2016).
33. N. R. Brown, A. L. Qualls, **B. R. Betzler**, J. J. Carbajo, M. S. Greenwood, R. E. Hale, T. J. Harrison, J. J. Powers, and K. R. Robb, “Core Design Characteristics of the Fluoride Salt-Cooled High Temperature Demonstration Reactor,” *Proc. ICAPP 2016 – Nuclear Innovation: Inventing the Future for Existing and New Nuclear Power*, San Francisco, CA, USA, Apr. 17–20 (2016).
32. M. S. Greenwood, N. R. Brown, **B. R. Betzler**, and G. T. Mays, “Summary of the Workshop on Molten Salt Reactor Technologies Commemorating the 50th Anniversary of the Startup of the Molten Salt Reactor Experiment,” *Proc. ICAPP 2016 – Nuclear Innovation: Inventing the Future for Existing and New Nuclear Power*, San Francisco, CA, USA, Apr. 17–20 (2016).
31. **B. R. Betzler**, B. J. Ade, D. Chandler, G. Ilas, and E. E. Sunny, “Optimization of Depletion Modeling and Simulation for the High Flux Isotope Reactor,” *Proc. ANS Mathematics & Computation Topical Meeting*, Nashville, TN, USA, Apr. 19–23 (2015).[†]

30. **B. R. Betzler**, B. C. Kiedrowski, W. R. Martin, and F. B. Brown, “Calculating α Eigenvalue Spectra with Monte Carlo,” *Proc. ANS Nuclear Criticality Safety Topical Meeting*, Wilmington, NC, USA, Sep. 29–Oct. 3 (2013).[†]
29. **B. R. Betzler**, B. C. Kiedrowski, F. B. Brown, and W. R. Martin, “Calculating Infinite-Medium α -Eigenvalue Spectra with a Transition Rate Matrix Method,” *Proc. ANS Mathematics & Computation Topical Meeting*, Sun Valley, ID, USA, May 5–9 (2013).[†]
28. A. T. Pavlou, **B. R. Betzler**, T. P. Burke, J. C. Lee, W. R. Martin, W. N. Pappo, and E. E. Sunny, “Eigenvalue Sensitivity Studies for the Fort St. Vrain High Temperature Gas-Cooled Reactor to Account for Fabrication and Modeling Uncertainties,” *Proc. PHYSOR 2012 – Advances in Reactor Physics*, Knoxville, TN, USA, Apr. 15–20 (2012).
27. **B. R. Betzler**, E. E. Sunny, W. R. Martin, and J. C. Lee, “Coupled Nuclear-Thermal-Hydraulic Calculations for Fort St. Vrain Reactor,” *Proc. NURETH 14 – The 14th International Topical Meeting on Nuclear Reactor Thermalhydraulics*, Toronto, Ontario, Canada, Sep. 25–30 (2011).[†]

TRANSACTIONS & SUMMARIES

26. M. S. Greenwood and **B. R. Betzler**, “Kinetic Precursor Drift Flux Model for Fluid-Fueled Molten Salt Reactors,” *Transactions of the American Nuclear Society*, **118** (submitted).
25. **B. R. Betzler**, D. Chandler, E. E. Davidson (née Sunny), and G. Ilas, “Design Optimization Studies for a High Flux Isotope Reactor Low-Enriched Uranium Core,” *Transactions of the American Nuclear Society*, **117** (2017).
24. Z. G. Skirpan, **B. R. Betzler**, J. J. Powers, and S. R. Blair, “Fuel Cycle Modeling and Simulation of the Molten Salt Breeder Reactor,” *Transactions of the American Nuclear Society*, **117** (2017).
23. C. A. Gentry, **B. R. Betzler**, and B. S. Collins, “Initial Benchmarking of ChemTriton and MPACT MSR Modeling Capabilities,” *Transactions of the American Nuclear Society*, **117** (2017).
22. **B. R. Betzler**, J. J. Powers, J. L. Peterson-Droogh, A. Worrall, “Fuel Cycle Analysis of Fast and Thermal Molten Salt Reactors,” *Proc. GLOBAL International Fuel Cycle Conference*, Seoul, Korea, Sep. 24–29 (2017).[†]
21. **B. R. Betzler**, J. J. Powers, A. Worrall, S. Robertson, L. Dewan, and M. Massie, “Two-Dimensional Fuel Cycle and Neutronic Analysis of the LEU-Fueled Transatomic Power Molten Salt Reactor,” *Transactions of the American Nuclear Society*, **116** (2017).[†]
20. **B. R. Betzler**, J. J. Powers, and A. Worrall, “Reactor Physics Analysis of Transitioning to a Thorium Fuel Cycle with Molten Salt Reactors,” *Transactions of the American Nuclear Society*, **115** (2016).[†]
19. **B. R. Betzler**, W. R. Martin, B. C. Kiedrowski, and F. B. Brown, “Calculating α Eigenvalues and Eigenfunctions of One-Dimensional Media,” *Proc. 23rd International Conference on Transport Theory*, Santa Fe, NM, USA, Sep. 15–20 (2013).
18. T. P. Burke, **B. R. Betzler**, J. C. Lee, W. R. Martin, A. T. Pavlou, W. Ji, and Y. Li, “A Constrained Sampling Methodology for TRISO Microspheres with Continuous Distributions of Diameters,” *Transactions of the American Nuclear Society*, **107** (2012).
17. **B. R. Betzler**, H. Hadgu, C. Lawrence, M. Orians, A. Pavlou, and A. Poitrasson-Rivière, “Irradiation of Food Using Spent Nuclear Fuel,” *Transactions of the American Nuclear Society*, **103** (2010).[†]
16. **B. R. Betzler**, W. R. Martin, and J. C. Lee, “MCNP5 Analysis of the Fort St. Vrain High-Temperature Gas-Cooled Reactor,” *Transactions of the American Nuclear Society*, **102** (2010).[†]

SELECTED TECHNICAL REPORTS

15. J. L. Peterson-Droogh, E. E. Davidson (née Sunny), **B. R. Betzler**, and A. Worrall, *Value Added by Fuel Cycle Dynamics Tools Directly Using Cross Section Data*, Fuel Cycle Options Campaign Report NTRD-FCO-2018-000447, Feb. (2018).
14. D. Chandler, **B. R. Betzler**, D. Cook, E. E. Davidson (née Sunny), G. Ilas, P. Jain, E. Popov, and D. G. Renfro, *Feasibility Studies for High Flux Isotope Reactor Conversion to Low-Enriched Uranium U_3Si_2 Fuel*, Oak Ridge National Laboratory Report ORNL/TM-2017/XXX, Oct. (2017).
13. **B. R. Betzler**, S. Robertson, E. E. Davidson, J. J. Powers, A. Worrall, L. Dewan, and M. Massie, *Assessment of Neutronic and Fuel Cycle Performance of the Transatomic Power Molten Salt Reactor*, Oak Ridge National Laboratory Report ORNL/TM-2017/475, CRADA/NFE-16-06345, Sep. (2017).
12. U. Mertzyurek, M. A. Jessee, **B. R. Betzler**, and S. M. Bowman, *SCALE Lattice Physics Performance Assessment*, NUREG/CR-, Oak Ridge National Laboratory Report ORNL/TM-2017/278, Jul. (2017).
11. B. J. Ade, W. J. Marshall, G. Ilas, **B. R. Betzler**, and S. M. Bowman, *The Impact of Operating Parameters and Correlated Parameters for Extended BWR Burnup Credit*, NUREG/CR-7240, Oak Ridge National Laboratory Report ORNL/TM-2017/46, Jun. (2017).
10. **B. R. Betzler**, J. J. Powers, A. Worrall, S. Robertson, L. Dewan, and M. Massie, *Two-Dimensional Neutronic and Fuel Cycle Analysis of the Transatomic Power Molten Salt Reactor*, Oak Ridge National Laboratory Report ORNL/TM-2016/742, Jan. (2017).
9. G. Ilas, **B. R. Betzler**, D. Chandler, E. E. Davidson (née Sunny), and D. G. Renfro, *Key Metrics for HFIR HEU and LEU Models*, Oak Ridge National Laboratory Report ORNL/TM-2016/581, Oct. (2016).
8. T. Kim, T. Taiwo, N. Stauff, T. Fei, G. Aliberti, B. Feng, F. Heidet, E. Hoffman, M. Todosow, A. Cuadra, B. Dixon, B. Carlson, R. Wigeland, **B. Betzler**, N. Brown, J. Powers, and A. Worrall, *Analyses of Advanced Fuel Cycle Options*, Fuel Cycle Options Campaign Report FCRD-FCO-2016-000111, Sep. (2016).
7. D. Chandler, **B. R. Betzler**, G. Hertz, G. Ilas, and E. E. Sunny, *Modeling and Depletion Simulations for a High Flux Isotope Reactor Cycle with a Representative Experiment Loading*, Oak Ridge National Laboratory Report ORNL/TM-2016/23, Sep. (2016).
6. A. Qualls, N. Brown, **B. Betzler**, J. Carbajo, M. Greenwood, R. Hale, T. Harrison, J. Powers, K. Robb, J. Terrell, and A. Wysocki, *Fluoride Salt-Cooled High-Temperature Demonstration Reactor Point Design*, Oak Ridge National Laboratory Report ORNL/TM-2016/85, Feb. (2016).
5. A. Qualls, **B. Betzler**, N. Brown, J. Carbajo, M. Greenwood, R. Hale, T. Harrison, J. Powers, K. Robb, and J. Terrell, *Preliminary Demonstration Reactor Point Design for the Fluoride Salt-Cooled High-Temperature Reactor*, Oak Ridge National Laboratory Report ORNL/TM-2015/700, Nov. (2015).
4. T. Kim, T. Taiwo, N. Stauff, G. Aliberti, B. Feng, E. Hoffman, M. Todosow, G. Raitses, G. Youinou, G. Palmiotti, A. Hummel, B. Dixon, H. Greenberg, W. Halsey, J. Powers, A. Worrall, and **B. Betzler**, *Analyses of Promising Evaluation Groups*, Fuel Cycle Options Campaign Report FCRD-FCO-2015-000012, Sep. (2015).
3. G. Ilas, D. Chandler, B. J. Ade, E. E. Sunny, **B. R. Betzler**, and D. L. Pinkston, *Modeling and Simulations for the High Flux Isotope Reactor Cycle 400*, Oak Ridge National Laboratory Report ORNL/TM-2015/36, Mar. (2015).
2. **B. R. Betzler**, B. C. Kiedrowski, F. B. Brown, and W. R. Martin, *Calculating α -Eigenvalues in a Continuous-Energy Infinite Medium with Monte Carlo*, Los Alamos National Laboratory Report LA-UR-12-24472, Aug. (2012).
1. W. R. Martin, J. C. Lee, **B. R. Betzler**, T. R. Burke, W. N. Pappo, A. T. Pavlou, and E. E. Sunny, *Creation of a Full-core HTR Benchmark with the Fort St. Vrain Initial Core and Assessment of Uncertainties in the FSV Fuel Composition and Geometry*, Department of Energy Report DOE-AC07-05ID14517, University of Michigan, Ann Arbor, MI, June (2012).

PRESENTATIONS AND POSTERS

13. **B. R. Betzler**, “Molten Salt Reactor Modeling and Simulation with SCALE,” *3rd Annual Molten Salt Reactor Workshop Modeling and Simulation Panel Session*, Oak Ridge, TN, USA, Oct. (2017).[†]
12. **B. R. Betzler**, “Molten Salt Reactor Technology Seminar Series: Reactor Safety, Physics, and Associated Fuel Cycle Performance,” *Oak Ridge National Laboratory Reactor and Nuclear Systems Division Seminar*, Oak Ridge, TN, USA, Aug. (2017).[†]
11. **B. R. Betzler** and D. Chandler, “High Flux Isotope Reactor Low-Enriched Uranium Core Design Study,” *NNSA Office of Material Management and Minimization Reactor Conversion Program - US High Performance Research Reactor Kick-Off Meeting Presentation*, Oak Ridge, TN, USA, July (2017).[†]
10. **B. R. Betzler**, “Adapting SCALE Methods for Molten Salt Reactor Analysis,” *Nuclear Science and Engineering Directorate Advisory Committee Meeting Presentation*, Oak Ridge, TN, USA, May (2017).[†]
9. **B. R. Betzler** and F. Heidet, “Module 4: Reactor Safety, Physics, and Associated Fuel Cycle Performance,” *Informational Seminar on Molten Salt Reactors*, DOE Office of Nuclear Energy, Germantown, MD, USA, Feb. (2017).[†]
8. **B. R. Betzler**, “Oak Ridge National Laboratory: Reactor Physics Applications,” *University of Michigan Department of Nuclear Engineering and Radiological Sciences Career Fair Kickoff Seminar*, Ann Arbor, MI, USA, Oct. (2016).[†]
7. E. E. Sunny, A. Worrall, J. J. Powers, J. L. Peterson, N. R. Brown, and **B. R. Betzler**, “Assessment to Inform on Future U.S. Fuel Cycle Options,” *Nuclear Science and Engineering Directorate Advisory Committee Meeting Poster Session*, Oak Ridge, TN, USA, Apr. (2016).
6. **B. R. Betzler**, “Calculating α Eigenvalues with Monte Carlo,” *Oak Ridge Postdoc Association Research Symposium Presentation*, Oak Ridge, TN, USA, July (2014).[†]
5. **B. R. Betzler**, W. R. Martin, and J. C. Lee, “Simulation of Fort St. Vrain Pulsed Neutron Experiments with MCNP5,” *R&D for the NNGP & Beyond Poster Session*, Salt Lake City, UT, USA, May (2012).
4. A. T. Pavlou, **B. R. Betzler**, T. P. Burke, J. C. Lee, W. R. Martin, W. N. Pappo, and E. E. Sunny, “Eigenvalue Sensitivity Studies for the Fort St. Vrain Reactor Benchmark,” *R&D for the NNGP & Beyond Poster Session*, Salt Lake City, UT, USA, May (2012).
3. **B. R. Betzler**, E. E. Sunny, J. C. Lee, and W. R. Martin, “Coupled Nuclear-Thermal-Hydraulic Calculations for Fort St. Vrain Reactor,” *R&D for the NNGP & Beyond Poster Session*, Albuquerque, NM, USA, Apr. (2011).[†]
2. **B. R. Betzler**, A. T. Pavlou, E. E. Sunny, T. P. Burke, W. N. Pappo, J. C. Lee, and W. R. Martin, “Neutronic Sensitivity Studies in Support of the Fort St. Vrain Reactor Benchmark,” *R&D for the NNGP & Beyond Poster Session*, Albuquerque, NM, USA, Apr. (2011).[†]
1. **B. R. Betzler**, W. R. Martin, and J. C. Lee, “Modeling of the FSV HTGR with MCNP5,” *R&D for the NNGP & Beyond Poster Session*, Englewood, CO, USA, Apr. (2010).