Christian M. Petrie

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Education:

- The Ohio State University: Columbus, OH (Ph.D. Nuclear Engineering, 2014)
- The Ohio State University: Columbus, OH (M.S. Nuclear Engineering, 2011)
- The Ohio State University: Columbus, OH (B.S. Mechanical Engineering, 2010)
  - Summa Cum Laude

Research Experience:

- *Oak Ridge National Laboratory (ORNL), Nuclear Energy and Fuel Cycle Division (NEFCD): Oak Ridge, TN*
  Group Leader, Advanced Fuel Fabrication & Instrumentation (Oct 2020–pres),
  Senior R&D Staff (Oct 2020–pres),
  R&D Staff (Jan 2018–Sep 2020),
  Weinberg Fellow, R&D Associate (July 2014 – Dec 2017)
  - Managing a group of 10 R&D staff members focused on the design, analysis, and advanced manufacturing of nuclear fuels and evaluating fuel performance using embedded sensors and state-of-the-art measurement techniques before, during, and after irradiation
  - Leveraging fiber optic sensing and additive manufacturing techniques to develop unique applications of embedded sensors and novel ways to measure spatially distributed temperature and strain, pressure, flow rate, corrosion, gamma heating, and liquid level
  - Technical lead and work package manager for all irradiations performed in the High Flux Isotope Reactor (HFIR) under the Advanced Fuels Campaign (AFC) and the Nuclear Science User Facilities (NSUF) Program
  - Responsible for the conception and commissioning of unique HFIR irradiation vehicles such as MiniFuel, which is now being adopted across the industry to accelerate fuel qualification
  - Primary investigator (PI) or co-investigator on 9 successful proposals funded by the Department of Energy, Office of Nuclear Energy (DOE-NE) in addition to 3 other DOE-NE funded projects directly related to HFIR experimental capabilities that I developed
  - PI for many R&D projects spanning 5 different programs
    - Laboratory Directed Research and Development (LDRD) project developing fiber optic sensors fuel in-pile fuel irradiations
    - LDRD embedding fiber optic sensors in metal components
    - NSUF-funded project irradiating wireless sensors in HFIR

    - Embedding sensors in ceramic structures for the Transformational Challenge Reactor
    - Embedding sensors in metal heat pipe reactor components under the DOE-NE Microreactor Program
    - In situ fiber optic corrosion sensor for future molten salt experiments in the DOE-NE Versatile Test Reactor
- *The Ohio State University (OSU): Columbus, OH*
  Nuclear Energy University Program Research Fellow (Sep 2010–July 2014)
    - Measured fiber optic signal degradation and sensor performance during irradiation at extremely high temperatures (up to 1600 °C)
    - Published on fundamental degradation mechanisms and limitations of fiber-based sensors for extreme temperature and radiation environments
    - Developed a novel broadband optical transmission measurement system and a method for fusion splicing amorphous SiO_2 fiber to single-crystal sapphire

- *The Ohio State University: Columbus, OH*
  Undergraduate Research Assistant (Sep 2009–Sep 2010)
    - Designed and fabricated high-temperature, electrically-heated in-core irradiation facilities for sensor performance testing
    - Developed models to characterize neutron flux conditions in the OSU research reactor and primary knock-on damage in materials

- *Idaho National Laboratory: Idaho Falls, ID*
  Materials Science Engineering Intern (June–Sep 2009)
    - Assembled and tested a water chemistry control board for stress corrosion cracking (SCC) testing of light water reactor materials

Honors & Awards:

- *Landis Young Member Engineering Achievement Award*: American Nuclear Society (2022)
- *ORNL Incentive Performance Award* (2021)
- *ORNL Technology Transfer*: Technology Commercialization Award (2021)
- *ORNL NEFCD*: Most individual publications (2021)
- *ORNL NEFCD*: 3rd most individual publications (2020)
- *National Academy of Engineering Frontiers of Engineering Symposium Nominee* (2019, 2020)
- *ORNL Significant Event Award* (2019)
- *ORNL Supplementary Performance Award* (2018)
- *ORNL Supplementary Performance Award* (2016)
- *Fuel Cycle R&D Excellence Award:* US DOE (2016)
- *Alvin M. Weinberg Fellowship:* ORNL (2014–2016)
- *Most Outstanding Researcher:* OSU Nuclear Engineering Program (2013)
- *Most Outstanding Scholar:* OSU Nuclear Engineering Program (2012)
- *Nuclear Energy University Program Fellowship:* US DOE (2010–2013)

- *Nuclear Energy University Program Scholarship:* US DOE (2009–2010)
- *Nuclear Engineering Scholarship:* Nuclear Regulatory Commission (2008–2010)
- *Engineering Dean's Award:* OSU (2006–2010)
- *University Scholarship:* OSU (2006–2010)
- *Hendrix Engineering Scholarship:* OSU (2008–2009)
- *Walter H. Kidd Engineering Scholarship:* OSU (2006–2007)
- *Elks National Foundation Scholarship:* Elks National Foundation (2006–2007)

Leadership Experience:
- *DOE-NE, AFC*, Deputy Technical Lead for Irradiation Testing (2020 – Present)
- *Halden Programme Group*, ORNL/DOE representative (2019 – Present)
- *Modelling, Experimentation, and Validation Summer School,* ORNL Scientific Secretariat (2019)
- *DOE-NE, AFC*, Work package manager for irradiation of ATF concepts (2017 – Present) and advanced reactor fuels (2019 – Present) in HFIR
- *DOE-NE, Microreactor Program*, Work package manager for Instrumentation and Sensors (2020 – Present)
- *DOE-NE, NSUF,* ORNL irradiation technical lead (2017 – Present)

Professional Experience:
- Member of The Minerals, Metals & Materials Society (2019 – Present)
- Member of the American Ceramic Society (2016 – Present)
- Member of the American Nuclear Society (2008 – Present)
- Member of the Alpha Nu Sigma Honorary (2011 – 2013)

Bibliography:

h-index: 17 (Google Scholar, 9/16/2022)

Journal Publications:

1. P. Sabharwall, J.L. Hartvigsen, T.J. Morton, J. Yoo, S. Qin, M. Song, D.P. Guillen, T. Unruh, J.E. Hansel, J. Jackson, J. Gehin, H. Trellue, D. Mascarenas, R.S. Reid, and **C.M. Petrie**, "Non-Nuclear Experimental Capabilities to Support Design, Development and Demonstration of Microreactors," Nuclear Technology, published online.
2. J. McDuffee, R. Christensen, D. Eichel, M. Simpson, S.Phongikaroon, X. Sun, J. Baird, A. Burak, S. Chapel, J. Choi, J. Gorton, D.E. Hamilton, D. Killinger, S. Miller, J. Palmer, **C. Petrie**, D. Sweeney, A. Schrell, and J. Vollmer, "Design and Control of a Fueled Molten Salt Cartridge Experiment for the Versatile Test Reactor," Nuclear Science and Engineering, published online.
3. B.W. Morgan, M. Van Zile, P. Sabharwall, M. Burger, **C.M. Petrie**, and I. Jovanovic, "Optical absorption of fused silica and sapphire exposed to neutron and gamma radiation with simultaneous thermal annealing," Journal of Nuclear Materials, Vol. 570 (2022) 153945.

4. D.C. Sweeney, A. Birri, and **C.M. Petrie**, "Hybrid Method for Monitoring Large Fabry-Pérot Cavity Displacements with Nanometer Precision," Optics Express, Vol. 30 (2022) 29148.
5. J.D. Arregui Mena, T. Koyanagi, E. Cakmak, **C.M. Petrie**, W.J. Kim, D. Kim, C.P. Deck, C. Sauder, J. Braun, and Y. Katoh, "Qualitative and quantitative analysis of neutron irradiation effects in SiC/SiC composites using X-ray computed tomography," Composites Part B, Vol. 238 (2022) 109896.
6. J.P. Gorton, D.C. Sweeney, **C.M. Petrie**, and J.L. McDuffee, "Simulation of natural circulation cartridge loop experiments and application to molten salt reactors," Nuclear Engineering and Design, Vol. 392 (2022) 111767.
7. A. Cheniour, G. Pastore, J. Harp, **C. Petrie**, and N. Capps, "Application of BISON to UO_2 MiniFuel fission gas release analysis," Journal of Nuclear Materials, Vol. 565 (2022) 153686.
8. H.C. Hyer and **C.M. Petrie**, "Effect of Slice Thickness on the Microstructural Development of Additively Manufactured SS316," Journal of Manufacturing Processes, Vol. 76 (2022) 666-674.
9. J.T. Jones, D.C. Sweeney, A. Birri, **C.M. Petrie**, and T.E. Blue, "Calibration of Distributed Temperature Sensors Using Commercially Available SMF-28 Optical Fiber from 22°C to 1000°C," IEEE Sensors, Vol. 22 (2022), 4144-4151.
10. H.C. Hyer, D.C. Sweeney, and **C.M. Petrie**, "Functional Fiber Optic Sensors Embedded in Stainless Steel Components using Ultrasonic Additive Manufacturing for Distributed Temperature and Strain Measurements," Additive Manufacturing, Vol. 52 (2022), 102681.
11. D.C. Sweeney and **C.M. Petrie**, "Extending the Range of Distributed Fiber Optic Strain Measurements Using a Local Adaptive Reference Approach," Optics Letters, Vol. 47 (2022), 269-272.
12. **C.M. Petrie**, A. Birri, and T.E. Blue, "Optical transmission and dimensional stability of single-crystal sapphire after high-dose neutron irradiation at various temperatures up to 688°C," Journal of Nuclear Materials, Vol. 559 (2022), 153432.
13. D.C. Sweeney, D. Sweeney, and **C.M. Petrie**, "Graphical Optimization of Spectral Shift Reconstructions for Optical Backscatter Reflectometry," Sensors, Vol. 21 (2021), 6154.
14. T. Koyanagi, H. Wang, J.D. Arregui Mena, **C.M. Petrie**, C.P. Deck, W.J. Kim, D. Kim, C. Sauder, J. Braun, and Y. Katoh, "Thermal diffusivity of SiC composite tubes: the effects of microstructure and irradiation," Journal of Nuclear Materials, Vol. 557 (2021), 153217.
15. N. Capps, R. Sweet, J. Harp, and **C.M. Petrie**, "High Burnup Fuel Stress Analysis Prior to and During a LOCA Transient," Journal of Nuclear Materials, Vol. 556 (2021), 153194.
16. D.C. Sweeney, A.M. Schrell, and **C.M. Petrie**, "Pressure-driven fiber optic sensor for online corrosion monitoring," IEEE Transactions on Instrumentation and Measurement, Vol. 70 (2021) 9510310.
17. **C.M. Petrie**, A.M. Schrell, D.N. Leonard. Y. Yang, B.C. Jolly, and K.A. Terrani, "Embedded sensors in additively manufactured silicon carbide," Journal of Nuclear Materials, Vol. 552 (2021) 153012.

18. K.A. Terrani, T. Lach, H. Wang, A. Le Coq, K. Linton, **C. Petrie**, T. Koyanagi, and T.S. Byun, "Irradiation stability and thermo-mechanical properties of 3D printed SiC," Journal of Nuclear Materials, Vol. 551 (2021) 152980.
19. A. Birri, **C.M. Petrie**, and T.E. Blue, "Parametric Analysis of an Optical Fiber–Based Gamma Thermometer for University Research Reactors Using an Analytic Thermal Model," Nuclear Technology, Vol. 207 (2021), 1865-1872.
20. G.L. Beausoleil, **C.M. Petrie**, W.J. Williams, A. Jokisaari, L. Capriotti, S. Novascone, C. Adkins, and M.J. Kerr, "Integrating Advanced Modeling and Accelerated Testing for a Modernized Fuel Qualification Paradigm," Nuclear Technology, Vol. 207 (2021), 1491-1510.
21. M. Pagan, **C. Petrie**, D. Leonard, N. Sridharan, D. Coffey, S. Zinkle, and S.S. Babu, "Interdiffusion of Elements during Ultrasonic Additive Manufacturing," Metallurgical and Materials Transactions A, Vol. 52 (2021) 1142-1157.
22. D.C. Sweeney, A.M. Schrell, and **C.M. Petrie**, "An Adaptive Reference Scheme to Extend the Functional Range of Optical Backscatter Reflectometry in Extreme Environments," IEEE Sensors, Vol. 21 (2021) 498-509.
23. J.M. Harp, R.N. Morris, **C.M. Petrie**, J.R. Burns, and K.A. Terrani, "Postirradiation Examination from Separate Effects Irradiation Testing of Uranium Nitride Kernels and Coated Particles," Journal of Nuclear Materials, Vol. 544 (2021) 152696.
24. **C.M. Petrie**, D.C. Sweeney, R.H. Howard, D.K. Felde, and J.L. McDuffee, "Single-phase, natural circulation annular flow measurements for cartridge loop irradiation experiments," Nuclear Engineering and Design, Vol. 370 (2020) 110900.
25. **C.M. Petrie** and N. Sridharan, "In situ measurement of phase transformations and residual stress evolution during welding using spatially-distributed fiber optic strain sensors," Measurement Science and Technology, Vol. 31 (2020) 125602.
26. D.C. Sweeney, A.M. Schrell, Y. Liu, and **C.M. Petrie**, "Metal-embedded fiber optic sensor packaging and signal demodulation scheme towards high-frequency dynamic measurements in harsh environments," Sensors and Actuators A: Physical, Vol. 312 (2020) 112075.
27. A. Birri, **C.M. Petrie**, and T.E. Blue, "Analytic Thermal Model of an Optical Fiber Based Gamma Thermometer and its Application in a University Research Reactor," IEEE Sensors, Vol. 20 (2020) 7060.
28. **C.M. Petrie**, A. Birri, and T.E. Blue, "High-Dose Temperature-Dependent Neutron Irradiation Effects on the Optical Transmission and Dimensional Stability of Amorphous Fused Silica," Journal of Non-Crystalline Solids, Vol. 525 (2019) 119668.
29. **C.M. Petrie**, J. Burns, A. Raftery, A.T. Nelson, and K.A. Terrani, "Separate Effects Irradiation Testing of Miniature Fuel Specimens," Journal of Nuclear Materials, Vol. 526 (2019) 151783.
30. **C.M. Petrie**, N. Sridharan, A. Hehr, M. Norfolk, and J. Sheridan, "High-temperature strain monitoring of stainless steel using fiber optics embedded in ultrasonically consolidated nickel layers," Smart Materials and Structures, Vol. 28 (2019) 085041.

31. G. Singh, T. Koyanagi, **C.M. Petrie**, C. Deck, K.A. Terrani, J. Arregui-Mena, and Y. Katoh, "Elastic Moduli Reduction in SiC-SiC Tubular Specimen after High Heat Flux Neutron Irradiation Measured by Resonant Ultrasound Spectroscopy," Journal of Nuclear Materials, Vol. 523 (2019) 391-401.
32. **C.M. Petrie**, N. Sridharan, M. Subramanian, A. Hehr, M. Norfolk, and J. Sheridan, "Embedded metallized optical fibers for high temperature applications," Smart Materials and Structures, Vol. 28 (2019), p. 055012.
33. K. Field, J.L. McDuffee, J. Geringer, **C.M. Petrie**, and Y. Katoh, "Evaluation of the Continuous Dilatometer Method of Silicon Carbide Thermometry for Passive Irradiation Temperature Determination," Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, Vol. 445 (2019) 46-56.
34. A. Bhattacharya, C.M. Parish, T. Koyanagi, **C.M. Petrie**, D. King, G. Hilmas, W.G. Fahrenholtz, S.J. Zinkle, and Y. Katoh, "Nano-scale microstructure damage by neutron irradiations in a novel Boron-11 enriched TiB2 ultra-high temperature ceramic," Acta Materialia, Vol. 165 (2019) 26-39.
35. **C.M. Petrie** and J.L. McDuffee, "Liquid level sensing for harsh environment applications using distributed fiber optic temperature measurements," Sensors & Actuators: A. Physical, Vol. 282 (2018) 114-123.
36. P. Mulligan, **C.M. Petrie**, J. McDuffee, H. Sakasegawa, Y. Katoh, and H. Tanigawa, "An F82H Steel Pressurized Tube Creep Capsule for Irradiation in HFIR," Nuclear Materials and Energy, Vol. 15, (2018) 254-260.
37. B.A. Wilson, **C.M. Petrie** and T.E. Blue, "High Temperature Effects on the Light Transmission through Sapphire Optical Fiber," Journal of the American Ceramic Society Vol. 101 (2018) 3452-3459.
38. **C.M. Petrie**, T. Koyanagi, J.L. McDuffee, C.P. Deck, Y. Katoh, and K.A. Terrani, "Experimental design and analysis for irradiation of SiC/SiC composite tubes under a prototypic high heat flux," Journal of Nuclear Materials Vol. 491 (2017) 94-104.
39. G. Singh, T. Koyanagi, **C. Petrie**, K. Terrani and Y. Katoh, "Evaluating the Irradiation Effects on the Elastic Properties of Miniature Monolithic SiC Tubular Specimens," Journal of Nuclear Materials Vol. 499 (2017) 107-110.
40. **C.M. Petrie**, D.P. Hawn, W. Windl, and T.E. Blue, "Reactor radiation-induced attenuation in fused silica optical fibers heated up to 1000°C," Journal of Non-Crystalline Solids Vol. 409 (2015) 88-94.
41. **C.M. Petrie** and T.E. Blue, "In-situ reactor radiation-induced attenuation in sapphire optical fibers heated up to 1000°C," Nuclear Instruments and Methods in Physics Research B: Beam Interactions with Materials and Atoms Vol. 342 (2015) 91-97.
42. **C.M. Petrie** and T.E. Blue, "In-situ Thermally Induced Attenuation in Sapphire Optical Fibers Heated to 1400°C," Journal of the American Ceramic Society Vol. 98 (2014) 483-489.
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44. **C.M. Petrie**, W. Windl, and T.E. Blue, "In-situ Reactor Radiation-Induced Attenuation in Sapphire Optical Fibers," Journal of the American Ceramic Society Vol. 97 (2014) 3883-3889.
45. T.M. Wood, B. Blake, T.E. Blue, **C.M. Petrie**, and D. Hawn, "Evaluation of the Performance of Distributed Temperature Measurements with Single-mode Fiber using Rayleigh Backscatter up to 1000°C," IEEE Sensors Journal Vol. 14 (2014) 124-128.
46. D.P. Hawn, **C.M. Petrie**, T.E. Blue, and W. Windl, "In-situ Gamma Radiation-Induced-Attenuation in Silica Optical Fiber Heated up to 600°C," Journal of Non-Crystalline Solids Vol. 379 (2013) 192-200.
47. M. Rowan, T. Blue, E. Lahti, J. Talnagi, K. Herminghuysen, and **C. Petrie**, "A Comparison of Measurements and Calculations of the Effects of Scattered Radiation on Dosimeter Calibration in a Calibration Range," Health Physics Vol. 105 (2013) 261-270.
48. **C.M. Petrie**, R. Nimps, T. Blue, and K. Herminghuysen, "Evaluation of the Effects of Scattered Radiation on Dosimeter Calibration in a Calibration Range," Health Physics Vol. 104.1 (2013) 68-77.
49. **C.M. Petrie**, K. Herminghuysen, and T.E. Blue, "Evaluation of Scattered Radiation in a Calibration Range Using Exposure Rate Energy Spectra," Health Physics Vol. 102.1 (2012) 71-80.
50. D.R. Steele, **C.M. Petrie**, K. Herminghuysen, and T.E. Blue, "Evaluation of the Shadow Shield Technique for the Measurement of Scattered Radiation," Health Physics Vol. 101.1 (2011) 59-66.

Manuscripts Submitted for Publication:

1. H.C. Hyer, K. Carver, F.A. List, and **C.M. Petrie**, "Embedding Sensors in SS316 with Laser Powder Bed Fusion," Manufacturing Letters, under review.
2. J. Jones, A. Birri, K. McCary, **C.M. Petrie**, and T.E. Blue, "Utilization of an Optical Fiber Based Gamma Thermometer for Axial Power Inferencing of the Ohio State University Research Reactor," IEEE Sensors, under review.
3. J.P. Gorton, **C.M. Petrie**, and A.T. Nelson, "Neutronics and thermal hydraulics based approach for accelerating the screening and qualification of novel nuclear fuel concepts," Nuclear Engineering and Design, under review.

Conference Proceedings:

1. I. Wicoff, P. Jain, N. See, **C. Petrie**, D. Richardson, and H. Bindra, "Air Ingress and DLOFC Studies in Scaled HTGR Geometry Using Additively Manufactured TCR Fuel Elements," 29th International Conference on Nuclear Engineering (2022) 91741.
2. A.G. Le Coq, R.C. Gallagher, J.P. Gorton, K.D. Linton, and **C.M. Petrie**, "MiniFuel Experimental Capability at Oak Ridge National Laboratory," Transactions of the American Nuclear Society, Vol. 126 (2022) 473-475.
3. H.C. Hyer and C.M. Petrie, "Embedding Sensors in Stainless Steel using Laser Powder Bed Fusion," Transactions of the American Nuclear Society, Vol. 126 (2022) 497-500.

4. S. Qin, M. Song, J.S. Yoo, P. Sabharwall, and **C.M. Petrie**, "Code-to-code benchmark study for thermal stress modeling and preliminary analysis of the high-temperature single heat pipe experiment," The 19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (2022) 34766.
5. W.H. Ferrell IV, J.R. Houser, H.C. Hyer, and **C.M. Petrie**, "Methods to Evaluate Embedded Sensor Performance for the Transformational Challenge Reactor," Transactions of the American Nuclear Society, Vol. 125 (2021) 326-328.
6. J.P. Gorton, Z. Wallen, and **C.M. Petrie**, "Initial Design of High-Temperature MiniFuel Irradiation Experiments in the High Flux Isotope Reactor Removable Beryllium Region," Transactions of the American Nuclear Society, Vol. 125 (2021) 498-501.
7. A.G. Le Coq, **C.M. Petrie**, T. Koyanagi, K.D. Linton, and C.P. Deck, "Irradiation Testing of Silicon Carbide Joint Specimens in the High Flux Isotope Reactor," Transactions of the American Nuclear Society, Vol. 125 (2021) 486-489.
8. D.C. Sweeney, A.M. Schrell, and **C.M. Petrie**, "Adaptive Signal Processing of Optical Fiber Sensors for Monitoring Temperature During Chemical Vapor Infiltration," Transactions of the American Nuclear Society, Vol. 125 (2021) 358-361.
9. **C.M. Petrie** and N.D.B. Ezell, "Ultrasonically Embedded Sensors for Microreactor Health Monitoring," Nuclear Power Instrumentation, Control, and Human Machine Interface Technologies (2021) 416-424.
10. P.L. Mulligan, N.D.B. Ezell, K. Smith, K. Godsey, D.C. Sweeney, **C.M. Petrie**, J. Carvajal, S. Stafford, and J. Arndt, "In-Core Neutron Flux, Temperature, and Pressure Instrumentation for the WIRE-21 Experiment in the High Flux Isotope Reactor," Nuclear Power Instrumentation, Control, and Human Machine Interface Technologies (2021) 564-574.
11. D.C. Sweeney, A.M. Schrell, and **C.M. Petrie**, "The Transient Thermal Response of a Pressure-Driven Fabry-Pérot Cavity," Nuclear Power Instrumentation, Control, and Human Machine Interface Technologies (2021) 544-554.
12. A. Birri, **C. Petrie**, K. McCary, and T.E. Blue, "Comparison of Calculated and Measured Performance of an Optical Fiber Based Gamma Thermometer," Transactions of the American Nuclear Society, Vol. 124 (2021) 263-266.
13. N. Woolstenhulme, G.L. Beausoleil, C. Jensen, **C. Petrie**, and D. Wachs, "Irradiation Testing Methods for Fast Spectrum Reactor Fuels and Materials in DOE's Thermal Spectrum Test Reactors," Transactions of the American Nuclear Society, Vol. 124 (2021) 168-171.
14. R.C. Gallagher, T. Gerczak, G. Helmreich, **C. Petrie**, Z. Wallen, and R. Latta, "Thermal and Neutronic Analyses of High Particle Power TRISO Irradiations using MiniFuel," Transactions of the American Nuclear Society, Vol. 124 (2021) 314-316.
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17. **C.M. Petrie**, "Embedding Sensors in Metal and Ceramic Structures," Transactions of the American Nuclear Society, Vol. 122 (2020) 113-116.
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26. S. Gonderman, G. Jacobsen, T. Koyanagi, **C.M. Petrie**, and C. Deck, "Assessment of Pre-Irradiation SiC CMC Joint Performance in Representative Cladding Geometries," Proceedings of Top Fuel 2019 (2019) 675-683.
27. **C.M. Petrie**, N. Sridharan, A. Hehr, M. Norfolk, and J. Sheridan, "Embedding Fiber-Optic Strain Sensors Using Ultrasonic Additive Manufacturing," Transactions of the American Nuclear Society, Vol. 120 (2019) 438-441.
28. **C.M. Petrie**, P. Mulligan, and J. McDuffee, "Compressible Metal Foils for Temperature Control During Irradiation," Transactions of the American Nuclear Society Vol. 120 (2019) 299-302.
29. **C.M. Petrie**, J. Burns, A.T. Nelson, K.A. Terrani, "Separate Effects Miniature Fuel Irradiation Testing to Support Fuel Safety," Proceedings of the 41st Enlarged Halden Programme Group Meeting, Sandefjord, Norway (2019).

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31. J.R. Burns, **C.M. Petrie**, and D. Chandler, "Burnup Calculation Methodology for a Small-Scale Fuel Irradiation Experiment in the High Flux Isotope Reactor (HFIR)," Transactions of the American Nuclear Society Vol. 120 (2019) 841-844.
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