Curriculum Vitae

RYAN DAVID MCBRIDE

Associate Professor, University of Michigan
Nuclear Engineering & Radiological Sciences Department
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RESEARCH INTERESTS

Plasma physics, high-energy-density physics, nuclear fusion (magneto-inertial fusion, inertial confinement fusion, and fusion energy), pulsed-power science, advanced diagnostic instrumentation (imaging detector technology and micro-electromagnetic sensors), and dynamic material properties experiments

EDUCATION

- Ph.D., Cornell University, January 2009
  - Major / Minor: Electrical Engineering / Applied Physics
  - Dissertation: "Implosion dynamics, radiation characteristics, and spectroscopic measurements of wire-array z-pinches on the Cornell Beam Research Accelerator"
  - Thesis Advisor: Professor David Hammer, Ph.D.
  - GPA: 3.96/4.0
- M.S., Electrical Engineering, Cornell University, May 2007
- M.Eng., Electrical Engineering, Cornell University, May 2001
  - Project Report: "Design of a user interface to log digital receiver data for the CUPRI radar"
  - Certificate for Engineering Management Option
  - Certificate for Systems Engineering Option
  - Member of the Cornell Formula SAE racing team, 2000–2001
- B.S., Electrical Engineering, State University of New York, Binghamton, May 2000

RESEARCH & LEADERSHIP EXPERIENCE

- Associate Professor, Nuclear Engineering & Radiological Sciences (NERS), University of Michigan, 8/2016–present
  - Member of the Plasma, Pulsed-Power, and Microwave Laboratory
  - Supervising ~5 undergraduate students and 3 graduate students
  - Teaching NERS 575: Plasma Generation & Diagnostics Laboratory
  - Teaching NERS 471: Introduction to Plasma Physics & Controlled Fusion
- Research Manager & Physicist, High Energy Density Experiments Department, Sandia National Laboratories, 1/2015–8/2016
  - Supervised 6 department members, including Ph.D. experimentalists and the cryogenics development team; this group is responsible for designing and executing inertial confinement fusion experiments on the 20-MA Z pulsed-power accelerator
  - Team Lead for the Implosion Dynamics research group (12 Ph.D. researchers) within the Magnetized Liner Inertial Fusion (MagLIF) program at Sandia
  - Principal Investigator on a three-year, $1.3M, Laboratory Directed Research and Development (LDRD) project to study the physics of magnetic flux compression on the Z accelerator
  - Developed a new semi-analytic model of the Magnetized Liner Inertial Fusion concept
- Principal Member of the Technical Staff, Physics, Sandia National Laboratories, 1/2015
- Senior Member of the Technical Staff, Physics, Sandia National Laboratories, 11/2008–1/2015
  - Principal Investigator on several experimental campaigns to study the implosions of initially solid beryllium liners (tubes) on the Z accelerator for applications to inertial confinement fusion and dynamic material properties experiments
- Graduate Research Assistant, Laboratory of Plasma Studies, Cornell University, 9/2004–11/2008
- Graduate Research Assistant, Space Plasma Physics Laboratory, Cornell University, 6/2003–8/2004

PUBLICATIONS & PRESENTATIONS OVERVIEW

- 46 publications in peer-reviewed journals (7 as first author, 3 as second author, 6 as third author)
  - 8 publications in *Physical Review Letters* (1 as first author, 2 as second author, 1 as third)
- 25 publications in conference proceedings (1 as first author, 5 as third author)
- 2 library maintained technical reports (1 as first author, 1 as second author)
- 36 oral and poster presentations given as first author (14 as invited talks)
- Hirsch "*h*-index" rating of 20, with over 1200 citations, as per Google Scholar

INDUSTRY EXPERIENCE

- Endicott Interconnect Technologies, Inc., Engineer/Scientist, 11/2002–5/2003
- IBM, Microelectronics Division, Engineer/Scientist, 6/2001–11/2002
- General Electric Company, Engineering Co-op, Summer 1999

TEACHING EXPERIENCE

- Faculty Instructor, NERS 575: Plasma Generation & Diagnostics Laboratory, 4 credit hour graduate course, University of Michigan, Winter 2017
- Faculty Guest Lecturer (2 lectures), NERS 425: Applications of Radiation, Winter 2017
- Faculty Instructor, NERS 471: Introduction to Plasma Physics & Controlled Fusion, 3 credit hour undergraduate course, University of Michigan, Fall 2016
- Faculty Guest Lecturer (1 lecture), NERS 211: Introduction to Nuclear Engineering and Radiological Sciences, Fall 2016
- Grader, Introduction to Controlled Fusion, Cornell University, Spring 2007
- Head Teaching Assistant, Radio Frequency Circuits & Systems, Cornell University, Spring 2004
  - Instructed the laboratory component of the course and assisted with exam grading
  - Received an overall rating of 4.636 (out of 5.0) on student evaluations of teaching quality
- Teaching Assistant, Feedback Control Systems, Cornell University, Fall 2000

AWARDS & HONORS

- Sandia National Laboratories' Employee Recognition Award, cited for "Sierra Diagnostics Development", team member, 2016
- Department of Energy's National Nuclear Security Administration's Defense Programs Award of Excellence, cited for "First Integrated Magnetized Liner Inertial Fusion Experiments on Z", team member, 2014
- Sandia National Laboratories' Certificate of Excellence, cited for "Outstanding Performance and Lasting Contribution as the Principal Experimenter for the Sierra Campaign on Z", 2014
- Sandia National Laboratories' Certificate of Excellence, cited for "First Magnetized Liners on Z", team member, 2014
- Sandia National Laboratories' Employee Recognition Award, cited for "First Fully-Integrated Magnetized Liner Inertial Fusion Experiments on Z", team member, 2014
- Sandia National Laboratories' Employee Recognition Award, "Beryllium Liner Dynamics", 2013
- Work featured in Science Magazine, Discovery News, NBC News, and others:
  - http://news.sciencemag.org/2012/09/step-forward-fusion
  - http://news.discovery.com/tech/alternative-power-sources/sandia-does-dry-run-for-fusion-power-120918.htm
  - http://www.nbcnews.com/id/49105868/ns/technology_and_science-tech_and_gadgets/#.VBtM0Mezt2t
  - https://share.sandia.gov/news/resources/news_releases/nuclear_fusion/#.VBtmBcezt2t
- MAIK "Nauka / Interperiodica" Pleiades Publishing Award, for best publications in the journals of the Russian Academy of Sciences, coauthor on a winning paper in physics & mathematics, 2012
- Department of Energy's National Nuclear Security Administration's Defense Programs Award of Excellence, cited for "Magneto-Rayleigh-Taylor Experiments", team member, 2011

PROFESSIONAL & HONOR SOCIETIES

- American Physical Society, member
- Institute of Electrical and Electronics Engineers, member
- Eta Kappa Nu, electrical engineering honor society, member
- Tau Beta Pi, engineering honor society, member

PROFESSIONAL SERVICE

- Session organizer, International Conference on Plasma Science (ICOPS), Denver, CO, 2018
- Program committee member (inertial confinement fusion subcommittee) for the annual conference of the American Physical Society Division of Plasma Physics, 2017
- Session chair, International Conference on Dense Z-Pinches (DZP), Lake Tahoe, NV, 2017
- Undergraduate faculty advising, Nuclear Eng. & Rad. Sci., University of Michigan, 2016
- Poster judge for the MIPSE (Mich. Inst. for Plasma Sci. and Eng.) Graduate Symposium, 2016
- Poster judge for the Engineering Graduate Symposium, University of Michigan, 2016
- Workshop participant and whitepaper coauthor, Common Challenges in ICF, Santa Fe, NM, 2016
- Review panelist for the Laboratory Basic Science Program on the OMEGA Laser Facility, 2016
- Selection committee member for the Stockpile Stewardship Graduate Fellowship (SSGF), 2016
- Grant proposal reviewer and/or panelist for:
  - United States – Israel Binational Science Foundation (BSF), 2017
  - NSF/DOE Partnership in Basic Plasma Science and Engineering, 2016
  - Department of Energy's Joint Program in High Energy Density Plasma Science, 2015
  - Department of Energy's Fusion Energy Sciences Postdoctoral Research Program, 2014
  - Department of Energy's Joint Program in High Energy Density Laboratory Plasmas, 2013
  - NSF/DOE Partnership in Basic Plasma Science and Engineering, 2012
  - Department of Energy's Stewardship Science Academic Alliances (SSAA) program, 2012
  - Department of Energy's Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) solicitation, 2011
  - NSF/DOE Partnership in Basic Plasma Science and Engineering, 2011
- Panelist for Sandia National Laboratories' workshop on "How to be an effective PI", 2015
- Journal referee for the IEEE Transactions on Plasma Science: 2011, 2012, 2013, and 2014
- Journal referee for the University of Michigan Undergraduate Research Journal, 2017
- Journal referee for Review of Scientific Instruments, 2017
- Journal referee for Physics of Plasmas, 2015, 2016, 2017
- Journal referee for Physical Review Letters, 2016, 2017

INVITED TALKS

1. **R. D. McBride**, "Overview of pulsed-power-driven plasma physics at the University of Michigan", at the *8th Fundamental Science with Pulsed Power Workshop: Research Opportunities and User Meeting*, (Albuquerque, NM, July 16–19, 2017).

2. N. M. Jordan and **R. D. McBride**, "Current Research at the University of Michigan's Plasma, Pulsed-Power, and Microwave Laboratory", at the *Pulsed-Power and Microwaves Seminar of the Air Force Research Laboratory*, (Albuquerque, NM, July 13, 2017).

3. **R. D. McBride**, "Present and Future Research Directions at the University of Michigan's Plasma, Pulsed-Power, and Microwave Laboratory", at the *Naval Research Laboratory's Plasma Physics Division Colloquium*, (Washington, DC, June 12, 2017).

4. **R. D. McBride**, "Linear Transformer Drivers: Compact Pulsed-Power Technology for High Energy Density Experiments", ***Invited Tutorial*** given at the *Mini-Course on Charged Particle Beams and High-Powered Pulsed Sources, as part of the 44th IEEE International Conference on Plasma Science*, (Atlantic City, May 21–26, 2017).

5. **R. D. McBride**, "Magnetically driven implosions for nuclear fusion, radiation source development, laboratory astrophysics, and high-pressure material properties", held jointly by the *University of Michigan's Nuclear Engineering and Radiological Sciences Department Colloquium and the Michigan Institute for Plasma Science and Engineering Seminar*, (Ann Arbor, March 17, 2017): http://leccap.engin.umich.edu/leccap/viewer/r/i1ZOqc

6. **R. D. McBride**, "Magnetically driven implosions for nuclear fusion, radiation source development, laboratory astrophysics, and high-pressure material properties", at the *University of Michigan's Applied Physics Seminar*, (Ann Arbor, January 18, 2017).

7. **R. D. McBride**, "Z Facility Capabilities, Access, and Science", at the *High Energy Density Physics Summer School*, the University of California, San Diego, (La Jolla, August 17–21, 2015).

8. **R. D. McBride**, D. B. Sinars, S. A. Slutz, M. R. Gomez, A. B. Sefkow, S. B. Hansen, T. J. Awe, K. J. Peterson, P. F. Knapp, P. F. Schmit, D. C. Rovang, M. Geissel, R. A. Vesey, A. J. Harvey-Thompson, C. A. Jennings, M. R. Martin, R. W. Lemke, K. D. Hahn, E. C. Harding, M. E. Cuneo, J. L. Porter, G. A. Rochau, and W. A. Stygar "Magnetized Liner Inertial Fusion on the Z Pulsed-Power Accelerator", at the *3rd International Workshop on Radiation from High Energy Density Plasmas*, (Lake Tahoe, June 10–13, 2015).

9. **R. D. McBride**, K. J. Peterson, T. J. Awe, D. B. Sinars, M. R. Gomez, S. B. Hansen, C. A. Jennings, S. A. Slutz, M. R. Martin, R. W. Lemke, D. E. Bliss, P. F. Knapp, P. F. Schmit, D. C. Rovang, and M. E. Cuneo, "Experiments on Liner Dynamics and Magnetic Flux Compression for MagLIF", at the *26th IEEE Symposium on Fusion Engineering*, (Austin, May 31 – June 4, 2015).

10. **R. D. McBride**, "Magnetized Liner Inertial Fusion & Cylindrical Dynamic Materials Properties Experiments on the Z Pulsed-Power Accelerator", at the *Stewardship Science Graduate Fellowship Conference*, (Santa Fe, June 25–27, 2013): http://www.krellinst.org/ssgf/conf/2013/video/rmcbride

11. **R. D. McBride**, "Beryllium liner implosion experiments on the Z accelerator in preparation for Magnetized Liner Inertial Fusion (MagLIF)", at the *54th Annual Meeting of the American Physical Society Division of Plasma Physics*, (Providence, October 29 – November 2, 2012).

12. **R. D. McBride**, S. A. Slutz, D. B. Sinars, R. W. Lemke, M. R. Martin, C. A. Jennings, M. E. Cuneo, M. C. Herrmann, and B. E. Blue, "Beryllium Liner Implosions on Z: MRT & EOS Experiments", at the *1st Liner Fusion Workshop*, (Albuquerque, February 5–8, 2012).

13. **R. D. McBride**, "Radiography of magnetically-driven implosions of initially solid beryllium cylindrical shells for equation-of-state studies at the Z pulsed-power facility", at the *17th Biennial International Conference of the American Physical Society Topical Group on Shock Compression of Condensed Matter*, (Chicago, June 26 – July 1, 2011).

14. **R. D. McBride**, S. A. Slutz, D. B. Sinars, R. W. Lemke, M. R. Martin, C. A. Jennings, J.-P. Davis, B.E. Blue, M. E. Cuneo, D. G. Flicker, M. C. Herrmann, and J. L. Porter, "Beryllium liner z-pinch implosions for inertial confinement fusion and dynamic materials studies at the Z pulsed-power facility", at the *3rd International Conference on High Energy Density Physics*, (Lisbon, May 17–20, 2011).

PUBLICATIONS IN PEER-REVIEWED JOURNALS

1. P. F. Knapp, M. R. Martin, D. H. Dolan, K. Cochrane, D. Dalton, J.-P. Davis, C. A. Jennings, G. P. Loisel, D. H. Romero, I. C. Smith, E. P. Yu, M. R. Weis, T. R. Mattsson, **R. D. McBride**, K. Peterson, J. Schwarz, and D. B. Sinars, "Direct measurement of the inertial confinement time in a magnetically driven implosion", *Phys. Plasmas* **24**, 042708 (2017).

2. M. R. Gomez, R. M. Gilgenbach, M. E Cuneo, C. A. Jennings, **R. D. McBride**, E. M. Waisman, B. T. Hutsel, W. A. Stygar, D. V. Rose, and Y. Maron, "Experimental study of current loss and plasma formation in the Z machine post-hole convolute", *Phys. Rev. ST Accel. Beams* **20**, 010401 (2017).

3. P. F. Knapp, C. Ball, K. Austin, S. B. Hansen, M. D. Kernaghan, P. W. Lake, D. J. Ampleford, L. A. McPherson, D. Sandoval, P. Gard, M. Wu, C. Bourdon, G. A. Rochau, **R. D. McBride**, and D. B. Sinars, "A new time and space resolved transmission spectrometer for research in inertial confinement fusion and radiation source development", *Rev. Sci. Instrum.* **88**, 013504 (2017).

4. **R. D. McBride**, S. A. Slutz, R. A. Vesey, M. R. Gomez, A. B. Sefkow, S. B. Hansen, P. F. Knapp, P. F. Schmit, M. Geissel, A. J. Harvey-Thompson, C. A. Jennings, E. C. Harding, T. J. Awe, D. C. Rovang, K. D. Hahn, M. R. Martin, K. R. Cochrane, K. J. Peterson, G. A. Rochau, J. L. Porter, W. A. Stygar, E. M. Campbell, C. W. Nakhleh, M. C. Herrmann, M. E. Cuneo, and D. B. Sinars, "Exploring magnetized liner inertial fusion with a semi-analytic model", *Phys. Plasmas* **23**, 012705 (2016).

5. P. F. Schmit, A. L. Velikovich, **R. D. McBride**, G. K. Robertson, "Controlling Rayleigh-Taylor Instabilities in Magnetically Driven Solid Metal Shells by Means of a Dynamic Screw Pinch", *Phys. Rev. Lett.* **117**, 205001 (2016).

6. T. J. Awe, K. J. Peterson, E. P. Yu, **R. D. McBride**, D. B. Sinars, M. R. Gomez, C. A. Jennings, M. R. Martin, S. E. Rosenthal, D. G. Schroen, A. B. Sefkow, S. A. Slutz, K. Tomlinson, and R. A. Vesey, "Experimental Demonstration of the Stabilizing Effect of Dielectric Coatings on Magnetically Accelerated Imploding Metallic Liners", *Phys. Rev. Lett.* **116**, 065001 (2016).

7. **R. D. McBride** and S. A. Slutz, "A semi-analytic model of magnetized liner inertial fusion", *Phys. Plasmas* **22**, 052708 (2015).

8. W. A. Stygar, T. J. Awe, J. E. Bailey, N. L. Bennett, E.W. Breden, E. M. Campbell, R. E. Clark, R. A. Cooper, M. E. Cuneo, J. B. Ennis, D. L. Fehl, T. C. Genoni, M. R. Gomez, G.W. Greiser, F. R. Gruner, M. C. Herrmann, B. T. Hutsel, C. A. Jennings, D. O. Jobe, B. M. Jones, M. C. Jones, P. A. Jones, P. F. Knapp, J. S. Lash, K. R. LeChien, J. J. Leckbee, R. J. Leeper, S. A. Lewis, F.W. Long, D. J. Lucero, E. A. Madrid, M. R. Martin, M. K. Matzen, M. G. Mazarakis, **R. D. McBride**, G. R. McKee, C. L. Miller, J. K. Moore, C. B. Mostrom, T. D. Mulville, K. J. Peterson, J. L. Porter, D. B. Reisman, G. A. Rochau, G. E. Rochau, D. V. Rose, D. C. Rovang, M. E. Savage, M. E. Sceiford, P. F. Schmit, R. F. Schneider, J. Schwarz, A. B. Sefkow, D. B. Sinars, S. A. Slutz, R. B. Spielman, B. S. Stoltzfus, C. Thoma, R. A. Vesey, P. E. Wakeland, D. R. Welch, M. L. Wisher, and J. R. Woodworth, "Conceptual designs of two petawatt-class pulsed-power accelerators for high-energy-density-physics experiments", *Phys. Rev. ST Accel. Beams* **18**, 110401 (2015).

9. M. R. Gomez, S. A. Slutz, A. B. Sefkow, K. D. Hahn, S. B. Hansen, P. F. Knapp, P. F. Schmit, C. L. Ruiz, D. B. Sinars, E. C. Harding, C. A. Jennings, T. J. Awe, M. Geissel, D. C. Rovang, I. C. Smith, G. A. Chandler, G. W. Cooper, M. E. Cuneo, A. J. Harvey-Thompson, M. C. Herrmann, M. H. Hess, D. C. Lamppa, M. R. Martin, **R. D. McBride**, K. J. Peterson, J. L. Porter, G. A. Rochau, M. E. Savage, D. G. Schroen, W. A. Stygar, and R. A. Vesey, "Demonstration of thermonuclear conditions in magnetized liner inertial fusion experiments", *Phys. Plasmas* **22**, 056306 (2015).

10. S. B. Hansen, M. R. Gomez, A. B. Sefkow, S. A. Slutz, D. B. Sinars, K. D. Hahn, E. C. Harding, P. F. Knapp, P. F. Schmit, T. J. Awe, **R. D. McBride**, C. A. Jennings, M. Geissel, A. J. Harvey-Thompson, K. J. Peterson, D. C. Rovang, G. A. Chandler, G. W. Cooper, M. E. Cuneo, M. C. Herrmann, M. H. Hess, O. Johns, D. C. Lamppa, M. R. Martin, J. L. Porter, G. K. Robertson, G. A. Rochau, C. L. Ruiz, M. E. Savage, I. C. Smith, W. A. Stygar, R. A. Vesey, B. E. Blue, D. Ryutov, D. G. Schroen, and K. Tomlinson, "Diagnosing magnetized liner inertial fusion experiments on Z", *Phys. Plasmas* **22**, 056313 (2015).

11. D. J. Ampleford, S. N. Bland, C. A. Jennings, S. V. Lebedev, J. P. Chittenden, **R. D. McBride**, B. Jones, J. D. Serrano, M. E. Cuneo, G. N. Hall, F. Suzuki-Vidal, and S. C. Bott-Suzuki, "Investigating Radial Wire Array Z-Pinches as a Compact X-Ray Source on the Saturn Generator", *IEEE Trans. Plasma Sci.* **43**, 3344 (2015).

12. E. M. Waisman, **R. D. McBride**, M. E. Cuneo, D. F. Wenger, W. E. Fowler, W. A. Johnson, L. I. Basilio, R. S. Coats, C. A. Jennings, D. B. Sinars, R. A. Vesey, B. Jones, D. J. Ampleford, R. W. Lemke, M. R. Martin, P. C. Schrafel, S. A. Lewis, J. K. Moore, M. E. Savage, and W. A. Stygar, "Voltage measurements at the vacuum post-hole convolute of the Z pulsed-power accelerator", *Phys. Rev. ST Accel. Beams* **17**, 120401 (2014).

13. D. C. Rovang, D. C. Lamppa, M. E. Cuneo, A. C. Owen, J. McKenney, D. W. Johnson, S. Radovich, R. J. Kaye, **R. D. McBride**, C. S. Alexander, T. J. Awe, S. A. Slutz, A. B. Sefkow, T. A. Haill, P. A. Jones, J. W. Argo, D. G. Dalton, G. K. Robertson, E. M. Waisman, D. B. Sinars, J. Meissner, M. Milhous, D. Nguyen, and C. Mielke "Pulsed-coil magnet systems for applying uniform 10-30 tesla fields to centimeter-scale targets on Sandia's Z facility", *Rev. Sci. Instrum.* **85**, 124701 (2014).

14. M. R. Gomez, S. A. Slutz, A. B. Sefkow, D. B. Sinars, K. D. Hahn, S. B. Hansen, E. C. Harding, P. F. Knapp, P. F. Schmit, C. A. Jennings, T. J. Awe, M. Geissel, D. C. Rovang, G. A. Chandler, G. W. Cooper, M. E. Cuneo, A. J. Harvey-Thompson, M. C. Herrmann, M. H. Hess, O. Johns, D. C. Lamppa, M. R. Martin, **R. D. McBride**, K. J. Peterson, J. L. Porter, G. K. Robertson, G. A. Rochau, C. L. Ruiz,

M. E. Savage, I. C. Smith, W. A. Stygar, and R. A. Vesey, "Experimental Demonstration of Fusion-Relevant Conditions in Magnetized Liner Inertial Fusion", *Phys. Rev. Lett.* **113**, 155003 (2014).

15. P. F. Schmit, P. F. Knapp, S. B. Hansen, M. R. Gomez, K. D. Hahn, D. B. Sinars, K. J. Peterson, S. A. Slutz, A. B. Sefkow, T. J. Awe, E. Harding, C. A. Jennings, G. A. Chandler, G. W. Cooper, M. E. Cuneo, M. Geissel, A. J. Harvey-Thompson, M. C. Herrmann, M. H. Hess, O. Johns, D. C. Lamppa, M. R. Martin, **R. D. McBride**, J. L. Porter, G. K. Robertson, G. A. Rochau, D. C. Rovang, C. L. Ruiz, M. E. Savage, I. C. Smith, W. A. Stygar, and R. A. Vesey, "Understanding fuel magnetization and mix using secondary nuclear reactions in magneto-inertial fusion", *Phys. Rev. Lett.* **113**, 155004 (2014).

16. T. J. Awe, C. A. Jennings, **R. D. McBride**, M. E. Cuneo, D. C. Lamppa, M. R. Martin, D. C. Rovang, D. B. Sinars, S. A. Slutz, A. C. Owen, K. Tomlinson, M. R. Gomez, S. B. Hansen, M. C. Herrmann, M. C. Jones, J. L. McKenney, G. K. Robertson, G. A. Rochau, M. E. Savage, D. G. Schroen, and W. A. Stygar, "Modified helix-like instability structure on imploding z-pinch liners that are pre-imposed with a uniform axial magnetic field", *Phys. Plasmas* **21**, 056303 (2014).

17. **R. D. McBride**, M. R. Martin, R. W. Lemke, J. B. Greenly, C. A. Jennings, D. C. Rovang, D. B. Sinars, M. E. Cuneo, M. C. Herrmann, S. A. Slutz, C. W. Nakhleh, D. D. Ryutov, J.-P. Davis, D. G. Flicker, B. E. Blue, K. Tomlinson, D. Schroen, R. M. Stamm, G. E. Smith, J. K. Moore, T. J. Rogers, G. K. Robertson, R. J. Kamm, I. C. Smith, M. Savage, W. A. Stygar, G. A. Rochau, M. Jones, M. R. Lopez, J. L. Porter, and M. K. Matzen, "Beryllium liner implosion experiments on the Z accelerator in preparation for magnetized liner inertial fusion", *Phys. Plasmas* **20**, 056309 (2013).

18. T. J. Awe, **R. D. McBride**, C. A. Jennings, D. C. Lamppa, M. R. Martin, D. C. Rovang, S. A. Slutz, M. E. Cuneo, A. C. Owen, D. B. Sinars, K. Tomlinson, M. R. Gomez, S. B. Hansen, M. C. Herrmann, J. L. McKenney, C. Nakhleh, G. K. Robertson, G. A. Rochau, M. E. Savage, D. G. Schroen, and W. A. Stygar, "Observations of Modified Three-Dimensional Instability Structure for Imploding Z-Pinch Liners that are Premagnetized with an Axial Field", *Phys. Rev. Lett.* **111**, 235005 (2013).

19. D. H. Dolan, R. W. Lemke, **R. D. McBride**, M. R. Martin, E. Harding, D. G. Dalton, B. E. Blue, and S. S. Walker, "Tracking an imploding cylinder with photonic Doppler velocimetry", *Rev. Sci. Instrum.* **84**, 055102 (2013).

20. G. N. Hall, S. V. Lebedev, F. Suzuki-Vidal, G. Swadling, J. P. Chittenden, S. N. Bland, A. Harvey-Thompson, P. F. Knapp, I. C. Blesener, **R. D. McBride**, D. A. Chalenski, K. S. Blesener, J. B. Greenly, S. A. Pikuz, T. A. Shelkovenko, D. A. Hammer, and B. R. Kusse, "Ablation dynamics in coiled wire-array Z-pinches", *Phys. Plasmas* **20**, 022703 (2013).

21. **R. D. McBride**, S. A. Slutz, C. A. Jennings, D. B. Sinars, M. E. Cuneo, M. C. Herrmann, R.W. Lemke, M. R. Martin, R. A. Vesey, K. J. Peterson, A. B. Sefkow, C. Nakhleh, B. E. Blue, K. Killebrew, D. Schroen, T. J. Rogers, A. Laspe, M. R. Lopez, I. C. Smith, B. W. Atherton, M. Savage, W. A. Stygar, and J. L. Porter, "Penetrating Radiography of Imploding and Stagnating Beryllium Liners on the Z Accelerator", *Phys. Rev. Lett.* **109**, 135004 (2012).

22. D. B. Sinars, **R. D. McBride**, S. A. Pikuz, T. A. Shelkovenko, D. F. Wenger, M. E. Cuneo, E. P. Yu, J. P. Chittenden, E. C. Harding, S. B. Hansen, B. P. Peyton, D. J. Ampleford, and C. A. Jennings, "Investigation of High-Temperature Bright Plasma X-ray Sources Produced in 5-MA X-Pinch Experiments", *Phys. Rev. Lett.* **109**, 155002 (2012).

23. M. R. Martin, R. W. Lemke, **R. D. McBride**, J. P. Davis, D. H. Dolan, M. D. Knudson, K. R. Cochrane, D. B. Sinars, I. C. Smith, M. Savage, W. A. Stygar, K. Killebrew, D. G. Flicker, and M. C. Herrmann, "Solid liner implosions on Z for producing multi-megabar, shockless compressions", *Phys. Plasmas* **19**, 056310 (2012).

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1. **R. D. McBride**, P. C. Campbell, S. M. Miller, J. Woolstrum, D. A. Yager-Elorriaga, A. M. Steiner, A. Rao, F. B. Darby, A. Denniston, C. Wagner, A. S. Safronova, V. L. Kantsyrev, I. K. Shrestha, V. V. Shlyaptseva, M. T. Schmidt-Petersen, C. J. Butcher, S. A. Slutz, M. R. Gomez, M. Jones, J. J. Leckbee, M. L. Wisher, M. L. Kiefer, D. B. Sinars, W. A. Stygar, M. E. Cuneo, N. M. Jordan, Y. Y. Lau, and R. M. Gilgenbach, "Status of Linear Transformer Driver Facilities for High-Density Z-Pinch Experiments at the University of Michigan", at the 10th International Conference on Dense Z-Pinches, (Lake Tahoe, NV, August 13–17, 2017).

2. **R. D. McBride**, P. C. Campbell, S. M. Miller, J. Woolstrum, A. Rao, A. Denniston, F. B. Darby, M. Hua, C. Wagner, M. Bondin, D. Beqi, E. Leppink, A. M. Steiner, D. A. Yager-Elorriaga, J. J. Leckbee, M. L. Wisher, M. L. Kiefer, W. A. Stygar, M. E. Cuneo, N. M. Jordan, Y. Y. Lau, and R. M. Gilgenbach, "Status of Linear Transformer Driver Facilities for High Energy Density Physics Experiments at the University of Michigan", at the *21st IEEE International Pulsed Power Conference,* (Brighton, UK, June 18–22, 2017).

3. **R. D. McBride**, D. E. Bliss, M. R. Martin, C. A. Jennings, D. C. Lamppa, D. H. Dolan, R. W. Lemke, D. C. Rovang, G. A. Rochau, M. E. Cuneo, D. B. Sinars, T. P. Intrator, and T. E. Weber, "Direct measurement of magnetic flux compression on the Z pulsed-power accelerator", at the *58th Annual Meeting of the American Physical Society Division of Plasma Physics,* (San Jose, October 31–November 4, 2016).

4. **R. D. McBride** and S. A. Slutz, "Semi-analytic modeling and simulation of magnetized liner inertial fusion", at the 9*th International Conference on Dense Z-Pinches*, (Napa, August 3–7, 2014).

5. **R. D. McBride**, S. A. Slutz, and S. B. Hansen, "Semi-analytic modeling and simulation of magnetized liner inertial fusion", at the *55th Annual Meeting of the American Physical Society Division of Plasma Physics*, (Denver, November 11–15, 2013).

6. **R. D. McBride**, S. A. Slutz, D. B. Sinars, R. W. Lemke, M. R. Martin, C. A. Jennings, M. E. Cuneo, M. C. Herrmann, and B. E. Blue, "Beryllium liner z-pinches for magneto-Rayleigh-Taylor studies on Z", at

the *53rd Annual Meeting of the American Physical Society Division of Plasma Physics*, (Salt Lake City, November 14–18, 2011).

7. **R. D. McBride**, K. S. Bell, I. C. Blesener, D. A. Chalenski, J. D. Douglass, J. B. Greenly, P. F. Knapp, S. A. Pikuz, T. A. Shelkovenko, T. Blanchard, H. Wilhelm, D. A. Hammer, B. R. Kusse, "Implosion dynamics of wire-array z-pinches on the COBRA accelerator", at the *49th Annual Meeting of the American Physical Society Division of Plasma Physics*, (Orlando, November 12–16, 2007).

POSTER PRESENTATIONS

1. **R. D. McBride**, S. A. Slutz, D. B. Sinars, R. A. Vesey, M. R. Gomez, A. B. Sefkow, S. B. Hansen, K. R. Cochrane, P. F. Schmit, P. F. Knapp, M. Geissel, A. J. Harvey-Thompson, C. A. Jennings, M. R. Martin, T. J. Awe, D. C. Rovang, D. C. Lamppa, K. J. Peterson, G. A. Rochau, J. L. Porter, W. A. Stygar, and M. E. Cuneo, "Exploring magnetized liner inertial fusion with a semi-analytic model", at the *57th Annual Meeting of the American Physical Society Division of Plasma Physics,* (Savannah, November 16–20, 2015).

2. **R. D. McBride**, M. R. Gomez, S. B. Hansen, C. A. Jennings, D. E. Bliss, P. F. Knapp, P. F. Schmit, T. J. Awe, M. R. Martin, D. B. Sinars, J. B. Greenly, T. P. Intrator, T. E. Weber, "Magnetic flux compression experiments on the Z pulsed-power accelerator", at the *56th Annual Meeting of the American Physical Society Division of Plasma Physics,* (New Orleans, October 27–31, 2014).

3. **R. D. McBride**, D. C. Lamppa, D. C. Rovang, T. J. Awe, J. B. Greenly, M. R. Martin, C. A. Jennings, M. R. Gomez, S. B. Hansen, M. H. Hess, T. P. Intrator, A. C. Owen, S. A. Slutz, C. W. Nakhleh, D. B. Sinars, M. E. Cuneo, and M. C. Herrmann, "Implementing and Diagnosing Magnetic Flux Compression on Z", at the *NNSA Laboratory Directed Research and Development Symposium*, (Washington D. C., June 12, 2013).

4. **R. D. McBride**, S. A. Slutz, R. W. Lemke, M. R. Martin, C. A. Jennings, T. J. Awe, D. C. Rovang, D. C. Lamppa, J.-P. Davis, D. B. Sinars, M. E. Cuneo, C. W. Nakhleh, D. G. Flicker, and M. C. Herrmann, "Beryllium Liner Implosion Experiments on Z for MagLIF and DMP", at the *External Review for Sandia National Laboratories' Programs in Radiation Effects and High Energy Density Sciences*, (Albuquerque, May 13–16, 2013).

5. **R. D. McBride**, S. A. Slutz, C. A. Jennings, D. B. Sinars, D. C. Rovang, M. E. Cuneo, M. C. Herrmann, R. W. Lemke, M. R. Martin, R. A. Vesey, K. J. Peterson, A. B. Sefkow, C. Nakhleh, "Experiments in Preparation for MagLIF", at the *External Review for Sandia National Laboratories' Programs in Radiation Effects and High Energy Density Sciences*, (Albuquerque, May 14–17, 2012).

6. **R. D. McBride**, S. A. Slutz, D. B. Sinars, R. W. Lemke, M. R. Martin, R. A. Vesey, M. E. Cuneo, M. C. Herrmann, "Beryllium Liner Z-Pinches for Magneto-Rayleigh-Taylor Studies on Z", at the *52nd Annual Meeting of the American Physical Society Division of Plasma Physics,* (Chicago, November 8–12, 2010).

7. **R. D. McBride**, M. E. Cuneo, C. Jennings, E. M. Waisman, and A. S. Chuvatin, "Load Current Multiplier for the Z Accelerator", at the *6th International Conference on Inertial Fusion Sciences and Applications*, (San Francisco, September 6–11, 2009).

8. **R. D. McBride**, M. E. Cuneo, D. A. Hammer, S. A. Pikuz, T. A. Shelkovenko, J. B. Greenly, B. R. Kusse, J. T. Blanchard, H. Wilhelm, J. D. Douglass, P. F. Knapp, K. S. Bell, I. C. Blesener, D. A. Chalenski, W. Syed, Y. Maron, and R. Doron, "Streaked Visible-Light Spectroscopy Measurements of Aluminum Wire-Array Z-Pinches on COBRA", at the *36th IEEE International Conference on Plasma Science*, (San Diego, May 31 – June 5, 2009).

9. **R. D. McBride**, T. A. Shelkovenko, S. A. Pikuz, D. A. Hammer, J. B. Greenly, B. R. Kusse, J. D. Douglass, P. F. Knapp, K. S. Bell, I. C. Blesener, D. A. Chalenski, "Implosion dynamics and radiation output of wire-array z-pinches on the COBRA pulsed-power generator", at the *35th IEEE International Conference on Plasma Science*, (Karlsruhe, June 15–19, 2008).

10. **R. D. McBride**, T. A. Shelkovenko, S. A. Pikuz, D. A. Hammer, J. B. Greenly, B. R. Kusse, J. D. Douglass, P. F. Knapp, K. S. Bell, I. C. Blesener, D. A. Chalenski, "Experimental studies of wire-array

z-pinches on the COBRA accelerator", at the *7th International Conference on Dense Z-Pinches*, (Alexandria, August 18–21, 2008).

11. **R. D. McBride**, T. A. Shelkovenko, S. A. Pikuz, D. A. Hammer, J. B. Greenly, B. R. Kusse, J. D. Douglass, P. F. Knapp, K. S. Bell, I. C. Blesener, D. A. Chalenski, "High-energy-density pinch columns and radiation production on the reconfigured Cornell Beam Research Accelerator (COBRA)", at the *2008 Stewardship Science Academic Alliance Program Symposium,* (Washington, D.C., February 26–28, 2008).

12. **R. D. McBride**, K. S. Bell, I. C. Blesener, D. A. Chalenski, J. D. Douglass, J. B. Greenly, P. F. Knapp, S. A. Pikuz, T. A. Shelkovenko, Y. T. Zhao, T. Blanchard, A. R. Mingaleev, H. Wilhelm, D. A. Hammer, B. R. Kusse, S. N. Bland, "Optical streak camera-based studies of wire-array z-pinch implosion dynamics on the 1-MA COBRA pulsed power generator", at the *34th IEEE International Conference on Plasma Science,* (Albuquerque, June 17–22, 2007).

13. **R. D. McBride**, S. A. Pikuz, I. C. Blesener, Y. T. Zhao, J. B. Greenly, D. A. Hammer, B. R. Kusse, "Optical streak camera images of wire-array z-pinches on the 1-MA COBRA pulsed power generator", at the *48th Annual Meeting of the American Physical Society Division of Plasma Physics,* (Philadelphia, October 30–November 3, 2006).

14. **R. D. McBride**, D. A. Chalenski, L. M. Maxson, S. A. Pikuz, T. A. Shelkovenko, J. D. Douglass, J. B. Greenly, D. A. Hammer, B. R. Kusse, "Laser-based imaging of wire array z-pinches and x-pinches on the COBRA pulsed power generator", at the *47th Annual Meeting of the American Physical Society Division of Plasma Physics,* (Denver, October 24–28, 2005).

15. **R. D. McBride**, J. D. Douglass, S. A. Pikuz, T. A. Shelkovenko, J. B. Greenly, D. A. Hammer, B. R. Kusse, "Experimental studies of multi-wire arrays on the COBRA generator", at the *32nd IEEE International Conference on Plasma Science,* (Monterey, June 20–23, 2005).

NOTABLE COURSEWORK (& TEXTS USED)

Graduate Level:

- Classical Electrodynamics (J. D. Jackson)
- Quantum Mechanics I (R. Shankar)
- Quantum Mechanics II (C. Cohen-Tannoudji)
- Statistical Mechanics (D. A. McQuarrie)
- Classical & Statistical Thermodynamics (W. Greiner)
- Introduction to Plasma Physics (F. F. Chen)
- Advanced Plasma Physics (T. J. M. Boyd & J. J. Sanderson)
- Cosmic Plasma Physics (B. V. Somov)
- Plasma Spectroscopy (H. R. Griem)
- Upper Atmospheric Physics I (M. C. Kelley)
- Upper Atmospheric Physics II (M. G. Kivelson & C. T. Russell *et al.*)
- Intermediate Dynamics/Mechanics (H. Goldstein)
- Nonlinear Dynamics & Chaos (S. Strogatz)
- Computational Physics (W. H. Press *et al*.)
- Mathematical Methods (D. A. McQuarrie)
- Theory of Linear Systems (course notes only)
- Applied Systems Engineering I & II (D. W. Oliver *et al*.)
- Project Management (course notes only)
- Electronic Commerce (course notes only)
- Entrepreneurship (course notes only)
- Energy Seminar I & II (visiting speakers, no text)

Undergraduate Level:

- Introduction to Controlled Fusion (A. A. Harms *et al*.)
- Electromagnetic Waves (S. Ramo *et al*.)
- Electromagnetics (D. K. Cheng)
- Radio Frequency Circuits & Systems (J. B. Hagen)
- Introduction to Radar & Remote Sensing (B. R. Mahafza)

- Electromechanical Machinery (S. J. Chapman)
- Electrical Circuits (J. W. Nilsson & S. A. Riedel)
- Feedback Control Systems I & II (C. L. Phillips & R. D. Harbor)
- Object Oriented Programing, Software Engineering, and Problem Solving in C++ (F. M. Carrano *et al*.)
- Digital Systems (V. P. Nelson *et al*.)
- Signals & Systems (J. W. Nilsson & S. A. Riedel)
- Signal Processing (course notes only)
- Electronics I & II (M. N. Horenstein)
- Semiconductor Devices (B. G. Streetman)
- Science & Engineering of Materials (D. R. Askeland)
- Fundamentals of Biomedical Engineering (A. E. Profio)