

PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Nuclear Engineering and Radiological Sciences

Ryan D. McBride, associate professor of nuclear engineering and radiological sciences, without tenure, Department of Nuclear Engineering and Radiological Sciences, College of Engineering, is recommended for the granting of tenure to be held with his title of associate professor of nuclear engineering and radiological sciences, Department of Nuclear Engineering and Radiological Sciences, College of Engineering.

Academic Degrees:

Ph.D.	2009	Cornell University, Electrical Engineering, Ithaca, NY
M.S.	2007	Cornell University, Electrical Engineering, Ithaca, NY
M.Eng.	2001	Cornell University, Electrical Engineering, Ithaca, NY
B.S.	2000	State University of New York, Electrical Engineering, Binghamton, NY

Professional Record:

2016 – present	Associate Professor (without tenure), Department of Nuclear Engineering and Radiological Sciences, University of Michigan
2015 – 2016	Department Manager, High Energy Density Experiments, Sandia National Laboratories, Albuquerque, NM
2015 – 2016	Principal Member of Technical Staff (Physics), High Energy Density Experiments, Sandia National Laboratories, Albuquerque, NM
2008 – 2015	Senior Member of Technical Staff (Physics), High Energy Density Experiments, Sandia National Laboratories, Albuquerque, NM

Summary of Evaluation:

Teaching: Professor McBride has an exemplary record of teaching. He has taught both graduate and undergraduate courses and has contributed to several others. He has taught Plasma Generation and Diagnostics Laboratory (NERS 575) three times and improved the experiments and updated the course notes. His (Q1/Q2) evaluations averaged 4.63/4.83, which are excellent. The letters from the students in this class all point to his diligence and commitment to teaching, and were uniformly positive. His achievements in the undergraduate course NERS 471 (Introduction to Plasma Physics and Controlled Nuclear Fusion) are similarly impressive with Q1/Q2 evaluations of 4.8/4.9 after teaching the course twice. Such high evaluations are particularly impressive for an introductory undergraduate class. In addition, Professor McBride has developed a new graduate-level course in pulsed-power driven, high-energy density plasmas (HEDP), which was offered for the first time in Fall 2020. He has also given guest lectures in several other classes. Professor McBride has graduated one Ph.D. student, with another five in progress (with one expected to graduate in 2021). He is a co-chair for another Ph.D. student and a member for several others. In addition, he is actively involved in advising M.S. and undergraduate students.

Research: Since arriving at Michigan, Professor McBride has taken the leadership role for high energy density plasma physics experiments, primarily driven by the 1-MA Linear Transformer Driver (MAIZE). His international scholarly reputation is exemplified by his more than 65 refereed, archival journal publications and an h index of 29 with over 2,400 citations. Professor McBride has been very successful in attracting federal funding to support his research. At Michigan, he has nearly

\$4.7 million as principal investigator with funding from a wide range of agencies, including the National Science Foundation, Department of Energy (Early Career Award, 2019), the U.S. Office of Naval Research (Young Investigator Award, 2018), the Department of Energy National Nuclear Security Agency, and the Air Force Office of Scientific Research. Professor McBride has supported and mentored a large number of graduate students in his research laboratory, including six Ph.D. students (with one graduating in 2020) and one post-doctoral scholar. In addition, he has involved over 20 undergraduates in his laboratory research at Michigan. External reviews praised his research accomplishments and reputation.

Recent and Significant Publications:

- P. C. Campbell, T. M. Jones, J. M. Woolstrum, N. M. Jordan, P. F. Schmit, J. B. Greenley, W. M. Potter, E. S. Lavine, B. R. Kusse, D. A. Hammer, R. D. McBride, "Stabilization of Liner Implosions via a Dynamic Screw Pinch," *Phys. Rev. Lett*, 2020; 125: 035001.
- S. M. Miller, S. A. Slutz, S. N. Bland, S. R. Klein, P. C. Campbell, J. M. Woolstrum, C. C. Kuranz, M. R. Gomez, N.M. Jordan, R. D. McBride, "A pulsed-power implementation of "Laser Gate" for increasing laser energy coupling and fusion yield in Magnetized Liner Inertial Fusion (MagLIF)," *Rev. Sci. Instrum*, 2020; 91: 063507.
- 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, J. L. Porter, "Penetrating Radiography of Imploding and Stagnating Beryllium Liners on the Z Accelerator," *Phys. Rev. Lett*, 2012; 109: 135004.
- 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, M. K. Matzen, "Beryllium liner implosion experiments on the Z accelerator in preparation for magnetized liner inertial fusion," *Phys. Plasmas* (invited), 2013; 20: 056309 1.
- J. M. Woolstrum, D. A. Yager-Elorriaga, P. C. Campbell, N. M. Jordan, C. E. Seyler, R. D. McBride, "Extended magnetohydrodynamics simulations of thin-foil z-pinch implosions with comparison to experiments," *Phys. Plasmas*, 09/2020; 27: 092705.

Service: Professor McBride has participated in a significant amount of university and professional service. In his department, he is the chair of the plasma research option and has served on the Executive Committee, Undergraduate Program Committee, a new faculty Launch Committee, and the DEI Committee. Professor McBride is also an active member of the UM Applied Physics program Admissions Committee. He has also served on the College of Engineering Nominating Committee. His external service involves national societies and conferences. Professor McBride has exerted great effort to improve diversity, equity and inclusion (DEI) in STEM, including participating in the Society of Women Engineers Summer Engineering Exploration Camp and assisting with UM's Detroit Area Pre-College Engineering Program. He was recently awarded a joint CoE-NERS DEI grant to fund recruiting trips to Minority Serving Institutions and Women's Colleges.

External Reviewers:

Reviewer A: "... I am very impressed with his record: 7 ongoing research grants (all as PI except 1 grant). The funding sources are also from diverse agencies such as AFOSR, DOE, ONR, and Sandia national lab. It is clear to me that he has a successful and sustainable research group in University of

Michigan, in particular in the area of Z-pinch research.”

Reviewer B: “The first thing that stands out are his ONR Young Investigator Award in 2018 and then his DOE Early Career Award in 2019. These early career awards are highly competitive and prestigious. At my institution, it is generally considered excellent to receive one of these types of awards, let alone two.”

Reviewer C: “Dr. McBride has an excellent record comparable to recently promoted faculty at [my institution]. Based on his past and present work, Dr. McBride has established a national and international recognition in his research area, and I strongly believe that his ongoing research will continue to benefit the high energy physics community.”

Reviewer D: “Not only is his work highly regarded, but it is clear that his efforts to mentor researchers in his group has been recognized by the plasma science community, with his students receiving an impressive haul of three invited talks, two best poster awards, and one laboratory residency graduate fellowship from the NNSA. This demonstrates the strong synergy between his efforts to advance science and his efforts to advance the capabilities of his students.”

Reviewer E: “... Prof. McBride’s research accomplishments are equal to some of the best researchers in the field at a similar career stage. He has produced impactful scholarly output and has secured grants from diverse funding sources.”

Summary of Recommendation: Professor McBride is a productive scholar who has achieved international recognition for his contributions to pulsed-power driven fusion energy and basic plasma science. His teaching and student mentoring are exemplary. His service contributions are expanding, including department, college and national committees. It is with the support of the College of Engineering Executive Committee that I recommend Ryan D. McBride for the granting of tenure to be held with his title of associate professor of nuclear engineering and radiological sciences, Department of Nuclear Engineering and Radiological Sciences, College of Engineering.



Alec D. Gallimore, Ph.D.
Robert J. Vlasic Dean of Engineering
College of Engineering

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