

Jack Davies Hare

Curriculum Vitae, April 2023

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Employment

- From 2021 **Massachusetts Institute of Technology**, Assistant Professor, Walter Henry Gayle (1929) Career Development Chair, Department of Nuclear Science and Engineering
- 2020–2021 **Imperial College London**, Post-doctoral Research Associate
- 2019–2020 **Max-Planck Institute for Plasma Physics**, Post-doctoral Research Associate
- 2017–2019 **Imperial College London**, Post-doctoral Research Associate

Education

- 2013–2017 **Imperial College London**, PhD, Plasma Physics
- 2011–2013 **Princeton University**, MA, Plasma Physics
- 2007–2011 **University of Cambridge**, 1st Class BA (hons) and MSci, Natural Sciences

Selected Grants and Awards

- 2022 Michigan plasma Science and Engineering (MIPSE) Early Career Award
- 2022-2025 Sub-award from ARPA-E OPEN grant led by Eden Inc. on electrohydraulic fracturing \$500k
- 2022-2024 PI, NSF EAGER: “Radiatively Cooled Magnetic Reconnection on Z”. \$218k.
- 2021-2024 PI, NSF/NNSA: “Developing Pulsed Power Driven Turbulent Reconnection Platforms”. \$750k.
- From 2024 Academic PI the Magnetically Ablated Reconnection on Z (MARZ) collaboration, awarded four shots (~\$3M) through the Z Fundamental Science Program FY22-23.
- 2018 European Physical Society Plasma Physics Division PhD Research Award.
- 2018 Imperial College Prize for Excellence in the Support of Teaching and Learning.

Selected Invited Talks

- Mar. 2023 MIPSE Seminar, University of Michigan, Ann Arbor MI
- Oct. 2022 HEDSA Symposium, Spokane, WA
- Oct. 2022 Plasma Physics Colloquium, Columbia University, NY
- Oct. 2022 Center for Integrated Plasma Studies Seminar, CU Boulder, CO
- Aug. 2022 Z Fundamental Science Workshop, Albuquerque, NM
- May. 2022 Magnetic Reconnection Workshop, Monterey CA
- April 2022 ZNetUS Workshop, Virtual
- April 2022 Z Fundamental Science Seminar, SNL, Albuquerque NM
- Feb. 2022 NNSA Stockpile Stewardship Academic Program Workshop, Virtual
- Jan 2022 Plasma, Pulsed Power, and Microwave Lab Seminar, U. Michigan, Ann Arbor MI
- Aug. 2021 Z Fundamental Science Workshop, Virtual
- May 2021 High Energy Density Science Association Colloquium

- July 2020 Heliophysics seminar, Princeton Plasma Physics Laboratory
- July 2020 Frontiers in Plasma Physics, Journal of Plasma Physics Colloquium
- Jan. 2019 Plasma Theory Group Seminar, University of Oxford, UK
- Oct. 2017 APS Division of Plasma Physics Annual Meeting, Milwaukee, WI
- March 2017 Magnetic Reconnection US-Japan Workshop 2017, Matsuyama, Japan

Academic Service

- 2023 IEEE ICOPS Conference Technical Area Lead.
- 2021 APS DPP Program Committee, Fundamental Science sub-committee.
- From 2021 MIT NSE departmental DEI committee.
- From 2021 APS Division of Plasma Physics Pride committee, co-founder and member-at-large.
- From 2020 Advisory Board member for the Journal of Plasma Physics.
- From 2017 Referee for *Physical Review Letters*, *Nature*, *Physical Review E*, *Journal of Plasma Physics*, *Review of Scientific Instruments*, and *Physics of Plasmas*, among others.
- 2018–2019 Chair of Imperial College Physics Department LGBT+ Allies Network.

Selected Teaching Experience

- From 2021 Advisor to four graduate students and eight undergraduate students at MIT
- Spring 2023 Instructor, 22.62, Fusion Energy for graduate students
- Fall 2022 Co-instructor, 22.033, Senior Design project for Nuclear Engineering undergraduates
- Spring 2022 Instructor, 22.62, Fusion Energy for graduate students
- Fall 2021 Instructor, 22.67 Principles of Plasma Diagnostics for graduate students
- Spring 2021 Co-instructor, 22.62, Fusion Energy for graduate students
- 2017–2018 Head of Experiment (Interferometry), first year undergraduate labs. *160 hours*.
- 2017–2018 BSc Project supervisor, continuous wave triature interferometer for HED plasmas. *40 hours*.
- 2014–2016 Demonstrator for 2nd year physics undergraduate labs at Imperial College. *240 hours*
- 2014–2016 Supervisor for first year projects for physics undergraduates at Imperial College. *100 hours*.
- 2013–2014 Teaching Assistant for first year physics undergraduates at Imperial College. *100 hours*.

Preprints

- 2022 V. Valenzuela-Villaseca, L. G. Suttle, F. Suzuki-Vidal, J. W. D. Halliday, S. Merlini, D. R. Russell, E. R. Tubman, **J. D. Hare**, J. P. Chittenden, M. E. Koepke, E. G. Blackman, and S. V. Lebedev. *Characterization of Quasi-Keplerian, Differentially Rotating, Free-Boundary Laboratory Plasmas*. DOI: 10.48550/arXiv.2201.10339. Under review at Physical Review Letters
- 2022 J. A. Percy, M. J. Rosenberg, T. M. Johnson, G. D. Sutcliffe, B. L. Reichelt, **J. D. Hare**, N. F. Loureiro, R. D. Petrasso, and C. K. Li. *Experimental Evidence of Plasmoids in High- β Magnetic Reconnection*. DOI: 10.48550/arXiv.2207.04119. Under review at Physical Review Letters

Publications

Twenty-seven publications, of which five are first author.

27. 2023 S. Jahanbakhsh, J. D. Hare, H. Meister, C. Ingesson, M. Majewski, F. Penzel, S. Schmitt, U. Walach, and M. Dubois. "Calibration and Thermal Test Results of Prototype Bolometer Sensors for ITER Fusion Reactor". *Review of Scientific Instruments* 94.3, p. 033503. DOI: 10.1063/5.0134449.
26. 2022 R. Datta, D. R. Russell, I. Tang, T. Clayson, L. G. Suttle, J. P. Chittenden, S. V. Lebedev, and **J. D. Hare**. "The Structure of 3-D Collisional Magnetized Bow Shocks in Pulsed-Power-Driven Plasma Flows". *Journal of Plasma Physics* 88.6, p. 905880604. DOI: 10.1017/S0022377822001118.
25. 2022 R. Datta, D. R. Russell, I. Tang, T. Clayson, L. G. Suttle, J. P. Chittenden, S. V. Lebedev, and **J. D. Hare**. "Time-Resolved Velocity and Ion Sound Speed Measurements from Simultaneous Bow Shock Imaging and Inductive Probe Measurements". *Review of Scientific Instruments* 93.10, p. 103530. DOI: 10.1063/5.0098823.
24. 2022 D. R. Russell, G. C. Burdiak, J. J. Carroll-Nellenback, J. W. D. Halliday, **J. D. Hare**, S. Merlini, L. G. Suttle, V. Valenzuela-Villaseca, S. J. Eardley, J. A. Fullalove, G. C. Rowland, R. A. Smith, A. Frank, P. Hartigan, A. L. Velikovich, J. P. Chittenden, and S. V. Lebedev. "Perpendicular Subcritical Shock Structure in a Collisional Plasma Experiment". *Physical Review Letters* 129.22, p. 225001. DOI: 10.1103/PhysRevLett.129.225001.
23. 2021 **J. D. Hare**, G. C. Burdiak, S. Merlini, J. P. Chittenden, T. Clayson, A. J. Crilly, J. W. D. Halliday, D. R. Russell, R. A. Smith, N. Stuart, L. G. Suttle, and S. V. Lebedev. "An Imaging Refractometer for Density Fluctuation Measurements in High Energy Density Plasmas". *Review of Scientific Instruments* 92.3, p. 033521. DOI: 10.1063/5.0040919.
22. 2021 L. G. Suttle, **J. D. Hare**, J. W. D. Halliday, S. Merlini, D. R. Russell, E. R. Tubman, V. Valenzuela-Villaseca, W. Rozmus, C. Bruulsema, and S. V. Lebedev. "Collective Optical Thomson Scattering in Pulsed-Power Driven High Energy Density Physics Experiments (Invited)". *Review of Scientific Instruments* 92.3, p. 033542. DOI: 10.1063/5.0041118.
22. 2021 J. W. D. Halliday, S. N. Bland, J. D. Hare, S. Parker, L. G. Suttle, D. R. Russell, and S. V. Lebedev. "A Time-Resolved Imaging System for the Diagnosis of x-Ray Self-Emission in High Energy Density Physics Experiments". *Review of Scientific Instruments* 92.12, p. 123507. DOI: 10.1063/5.0073174.
20. 2021 E. D. Filippov, S. S. Makarov, K. F. Burdonov, W. Yao, G. Revet, J. Béard, S. Bolaños, S. N. Chen, A. Guediche, **J. Hare**, D. Romanovsky, I. Y. Skobelev, M. Starodubtsev, A. Ciardi, S. A. Pikuz, and J. Fuchs. "Enhanced X-ray Emission Arising from Laser-Plasma Confinement by a Strong Transverse Magnetic Field". *Scientific Reports* 11.1, p. 8180. DOI: 10.1038/s41598-021-87651-8.
19. 2019 **J. D. Hare**, J. MacDonald, S. N. Bland, J. Dranczewski, J. W. D. Halliday, S. V. Lebedev, L. G. Suttle, E. R. Tubman, and W. Rozmus. "Two-Colour Interferometry and Thomson Scattering Measurements of a Plasma Gun". *Plasma Physics and Controlled Fusion* 61.8, p. 085012. DOI: 10.1088/1361-6587/ab2571.
18. 2019 L. G. Suttle, G. C. Burdiak, C. L. Cheung, T. Clayson, J. Halliday, **J. D. Hare**, S. Rusli, D. Russell, E. Tubman, A. Ciardi, N. F. Loureiro, J. Li, A. Frank, and S. V. Lebedev. "Interactions of Magnetized Plasma Flows in Pulsed-Power Driven Experiments". *Plasma Physics and Controlled Fusion*. DOI: 10.1088/1361-6587/ab5296.

17. 2018 **J. D. Hare**, L. G. Suttle, S. V. Lebedev, N. F. Loureiro, A. Ciardi, J. Chittenden, T. Clayson, S. J. Eardley, C. Garcia, J. W. D. Halliday, T. Robinson, R. A. Smith, N. Stuart, F. Suzuki-Vidal, and E. R. Tubman. "An Experimental Platform for Pulsed-Power Driven Magnetic Reconnection". *Physics of Plasmas* 25, p. 055703. DOI: 10.1063/1.5016280.
16. 2018 L. G. Suttle, **J. D. Hare**, S. V. Lebedev, A. Ciardi, N. F. Loureiro, G. C. Burdiak, J. P. Chittenden, T. Clayson, J. W. D. Halliday, N. Niasse, D. Russell, F. Suzuki-Vidal, E. Tubman, T. Lane, J. Ma, T. Robinson, R. A. Smith, and N. Stuart. "Ion Heating and Magnetic Flux Pile-up in a Magnetic Reconnection Experiment with Super-Alfvénic Plasma Inflows". *Physics of Plasmas* 25, p. 042108. DOI: 10.1063/1.5023664.
15. 2018 T. Clayson, S. V. Lebedev, F. Suzuki-Vidal, G. C. Burdiak, J. W. D. Halliday, **J. D. Hare**, J. Ma, L. G. Suttle, and E. R. Tubman. "Inverse Liner Z-Pinch: An Experimental Pulsed Power Platform for Studying Radiative Shocks". *IEEE Transactions on Plasma Science* 46.11, pp. 3734–3740. DOI: 10.1109/TPS.2018.2868757.
14. 2017 **J. D. Hare**, S. V. Lebedev, L. G. Suttle, N. F. Loureiro, A. Ciardi, G. C. Burdiak, J. P. Chittenden, T. Clayson, S. J. Eardley, C. Garcia, J. W. D. Halliday, N. Niasse, T. Robinson, R. A. Smith, N. Stuart, F. Suzuki-Vidal, G. F. Swadling, J. Ma, and J. Wu. "Formation and Structure of a Current Sheet in Pulsed-Power Driven Magnetic Reconnection Experiments". *Physics of Plasmas* 24, p. 102703. DOI: 10.1063/1.4986012.
13. 2017 **J. D. Hare**, L. Suttle, S. V. Lebedev, N. F. Loureiro, A. Ciardi, G. C. Burdiak, J. P. Chittenden, T. Clayson, C. Garcia, N. Niasse, T. Robinson, R. A. Smith, N. Stuart, G. F. Swadling, J. Ma, J. Wu, and Q. Yang. "Anomalous Heating and Plasmoid Formation in a Driven Magnetic Reconnection Experiment". *Physical Review Letters* 118, p. 085001. DOI: 10.1103/PhysRevLett.118.085001.
12. 2017 G. C. Burdiak, S. V. Lebedev, S. N. Bland, T. Clayson, **J. Hare**, L. Suttle, D. C. Garcia, J. P. Chittenden, A. Frank, and T. S. Lane. "The Structure of Bow Shocks Formed by the Interaction of Pulsed-Power Driven Magnetized Plasma Flows with Conducting Obstacles". *Physics of Plasmas* 24, p. 072713. DOI: 10.1063/1.4993187.
11. 2016 L. G. Suttle, **J. D. Hare**, S. V. Lebedev, G. F. Swadling, G. C. Burdiak, A. Ciardi, J. P. Chittenden, N. F. Loureiro, N. Niasse, F. Suzuki-Vidal, J. Wu, Q. Yang, T. Clayson, A. Frank, T. S. Robinson, R. A. Smith, and N. Stuart. "Structure of a Magnetic Flux Annihilation Layer Formed by the Collision of Supersonic, Magnetized Plasma Flows". *Physical Review Letters* 116.22, p. 225001. DOI: 10.1103/PhysRevLett.116.225001.
10. 2016 G. F. Swadling, S. V. Lebedev, G. N. Hall, F. Suzuki-Vidal, G. C. Burdiak, L. Pickworth, P. De Grouchy, J. Skidmore, E. Khoory, L. Suttle, M. Bennett, **J. D. Hare**, T. Clayson, S. N. Bland, R. A. Smith, N. H. Stuart, S. Patankar, T. S. Robinson, A. J. Harvey-Thompson, W. Rozmus, et al. "Experimental Investigations of Ablation Stream Interaction Dynamics in Tungsten Wire Arrays: Interpenetration, Magnetic Field Advection, and Ion Deflection". *Physics of Plasmas* 23, p. 056309. DOI: 10.1063/1.4948279.
9. 2016 G. Haerendel, L. Suttle, S. V. Lebedev, G. F. Swadling, **J. D. Hare**, G. C. Burdiak, S. N. Bland, J. P. Chittenden, N. Kalmoni, A. Frank, R. A. Smith, and F. Suzuki-Vidal. "Stop Layer: A Flow Braking Mechanism in Space and Support from a Lab Experiment". *Plasma Physics and Controlled Fusion* 58, p. 064001. DOI: 10.1088/0741-3335/58/6/064001.

8. 2015 G. C. Burdiak, S. V. Lebedev, F. Suzuki-Vidal, G. F. Swadling, S. N. Bland, N. Niasse, L. Suttle, M. Bennet, **J. Hare**, M. Weinwurm, R. Rodriguez, J. Gil, and G. Espinosa. "Cylindrical Liner Z-pinch Experiments for Fusion Research and High-Energy-Density Physics". *Journal of Plasma Physics* 81, pp. 1–20. DOI: 10.1017/S0022377815000318.
7. 2015 M. Bennett, S. Lebedev, G. Hall, L. Suttle, G. Burdiak, F. Suzuki-Vidal, **J. Hare**, G. Swadling, S. Patankar, M. Bocchi, J. Chittenden, R. Smith, A. Frank, E. Blackman, R. Drake, and A. Ciardi. "Formation of Radiatively Cooled, Supersonically Rotating, Plasma Flows in Z-pinch Experiments: Towards the Development of an Experimental Platform to Study Accretion Disk Physics in the Laboratory". *High Energy Density Physics* 17, pp. 63–67. DOI: 10.1016/j.hedp.2015.02.001.
6. 2014 G. F. Swadling, S. V. Lebedev, G. N. Hall, S. Patankar, N. H. Stewart, R. A. Smith, A. J. Harvey-Thompson, G. C. Burdiak, P. de Grouchy, J. Skidmore, L. Suttle, F. Suzuki-Vidal, S. N. Bland, K. H. Kwek, L. Pickworth, M. Bennett, **J. D. Hare**, W. Rozmus, and J. Yuan. "Diagnosing Collisions of Magnetized, High Energy Density Plasma Flows Using a Combination of Collective Thomson Scattering, Faraday Rotation, and Interferometry". *Review of Scientific Instruments* 85, 11E502. DOI: 10.1063/1.4890564.
5. 2014 S. V. Lebedev, L. Suttle, G. F. Swadling, M. Bennett, S. N. Bland, G. C. Burdiak, A. Ciardi, A. Clemens, P. D. Grouchy, G. N. Hall, **J. D. Hare**, N. Kalmoni, N. Niasse, S. Patankar, L. Sheng, A. Smith, J. Yuan, A. Frank, E. G. Blackman, and R. P. Drake. "The Formation of Reverse Shocks in Magnetized High Energy Density Supersonic Plasma Flows". *Physics of Plasmas* 21, p. 056305. DOI: 10.1063/1.4874334.
4. 2014 M. J. Bennett, S. V. Lebedev, G. N. Hall, L. Suttle, G. Burdiak, F. Suzuki-Vidal, **J. Hare**, G. Swadling, S. Patankar, M. Bocchi, J. P. Chittenden, R. Smith, A. Frank, E. Blackman, R. P. Drake, and A. Ciardi. "Rotating Plasma Disks in Dense Z-pinch Experiments". *AIP Conference Proceedings* 1639, pp. 71–75. DOI: 10.1063/1.4904780.
3. 2013 J. Schmitt, T. Abrams, L. Baylor, L. Berzak Hopkins, T. Biewer, D. Bohler, D. Boyle, E. Granstedt, T. Gray, **J. Hare**, C. Jacobson, M. Jaworski, R. Kaita, T. Kozub, B. LeBlanc, D. Lundberg, M. Lucia, R. Maingi, R. Majeski, E. Merino, et al. "Results and Future Plans of the Lithium Tokamak eXperiment (LTX)". *Journal of Nuclear Materials* 438, S1096–S1099. DOI: 10.1016/j.jnucmat.2013.01.241.
2. 2013 R. Majeski, T. Abrams, D. Boyle, E. Granstedt, **J. Hare**, C. M. Jacobson, R. Kaita, T. Kozub, B. LeBlanc, D. P. Lundberg, M. Lucia, E. Merino, J. Schmitt, D. Stotler, T. M. Biewer, J. M. Canik, T. K. Gray, R. Maingi, A. G. McLean, S. Kubota, et al. "Particle Control and Plasma Performance in the Lithium Tokamak eXperiment". *Physics of Plasmas* 20, p. 056103. DOI: 10.1063/1.4802195.
1. 2011 Y. Alaverdyan, N. Vamivakas, J. Barnes, C. Leboutellier, **J. Hare**, and M. Atatüre. "Spectral Tunability of a Plasmonic Antenna with a Dielectric Nanocrystal". *Optics Express* 19.19, pp. 18175–18181.