

Jack Davies Hare

Curriculum Vitae, September 2020

✉ jdhare@mit.edu

Employment

- From 2021 **Massachusetts Institute of Technology**, Assistant Professor.
- 2020 **Massachusetts Institute of Technology**, Visiting Principal Investigator.
- 2020 **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.
- 2010–2011 **University of Cambridge**, MSci, Natural Science.
- 2007–2010 **University of Cambridge**, BA (hons), 1st Class, Natural Sciences Tripos.

Research Experience

- 2017–2020 **Imperial College London**, Post-doctoral researcher with Sergey Lebedev.
Magnetised turbulence in high-energy-density plasmas. Development of new diagnostics.
Associate Supervisor of PhD Students. Significant lab management role.
- 2019–2020 **Max-Planck Institute for Plasma Physics**, Post-doctoral researcher with Hans Meister.
Design, prototyping and testing of bolometers and manometers for the ITER project..
- 2013–2017 **Imperial College London**, PhD student with Sergey Lebedev.
Pulsed power driven magnetic reconnection. Combined Thomson scattering, Faraday rotation
imaging, and fast framing cameras to link plasmoid formation to anomalous heating.
- 2011–2013 **Princeton Plasma Physics Laboratory**, Graduate student with Robert Kaita.
XUV spectroscopy of impurity ion content in a novel, lithium walled tokamak.
- 2010–2011 **University of Cambridge**, MSci student with Mete Atatüre.
Magnetometry using nitrogen vacancy defect qubits in nano-diamonds.

Invited Talks

- 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
- Jan. 2019 Visiting Academic Seminar, First Light Fusion, Oxford UK.
- May 2018 High Energy Density Laboratory Astrophysics, Kurashiki, Japan. *Given by L. Suttle*
- Oct. 2017 APS Division of Plasma Physics Annual Meeting, Milwaukee, USA
- June 2017 Plasmas à Paris Workshop on Magnetic Reconnection in Laboratory and Space Plasmas
- Mar. 2017 Magnetic Reconnection US-Japan Workshop 2017, Matsuyama, Japan

Publications

Nineteen publications, of which four are first author.

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* in press. 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 Magnetised 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, 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, J. Yuan, C. Burdiak, et al. "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. C. Schmitt, T. Abrams, L. R. Baylor, L. Berzak Hopkins, T. Biewer, D. Bohler, D. Boyle, E. Granstedt, T. Gray, **J. Hare**, C. M. Jacobson, M. Jaworski, R. Kaita, T. Kozub, B. LeBlanc, D. P. 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. Leboutteiller, **J. Hare**, and M. Atatüre. "Spectral Tunability of a Plasmonic Antenna with a Dielectric Nanocrystal". *Optics Express* 19.19, pp. 18175–18181.

Awards

- 2018 European Physical Society Plasma Physics Division PhD Research Award.
- 2018 Imperial College Prize for Excellence in the Support of Teaching and Learning.
- 2016 Malcolm G. Haines award for Outstanding Young Plasma Physicists.
- 2016 Voted best demonstrator by students in the second-year undergraduate teaching labs.
- 2015 EPSRC Science Photo Competition, 2nd place in Innovation category.

Scholarships and Grants

- 2013–2017 President's PhD Scholarship at Imperial College London.
- 2017 MECMATPLA Winter School travel grant, Montgenèvre, France.
- 2015 HEDSA Summer School travel grant, San Diego, USA.
- 2011–2013 Charles Ames Brooks Class of 1905 Scholarship at Princeton University.
- 2009–2011 Senior Scholar at Gonville and Caius College, University of Cambridge.

Academic Service

- From 2017 Referee for *Physical Review Letters*, *Nature*, *Physical Review E*, *Nature Physics Communications* and *Physics of Plasmas*
- 2018–2019 Organiser for Imperial College Plasma Physics Group Postgraduate Lectures.
- 2018–2019 Chair of Physics Department LGBT+ Allies Network.
- 2017–2019 Chair and organiser for Imperial College Plasma Physics Group Seminars.
- 2017–2019 Member of the Physics Research Associates Committee
- 2017 Student representative to the Postgraduate Research review panel at Imperial College.

Contributed Talks and Posters

- 2018 EPS Plasma Physics Division Annual Meeting, Prague, Czechia
- 2016 APS Division of Plasma Physics Annual Meeting, San Jose, USA
- 2016 High Energy Density Laboratory Astrophysics, Palo Alto, USA
- 2015 APS Division of Plasma Physics Annual Meeting, Savannah, USA
- 2014 APS Division of Plasma Physics Annual Meeting, New Orleans, USA
- 2014 International Conference on Plasma Science, Washington D.C., USA
- 2014 High Energy Density Laboratory Astrophysics, Bordeaux, France
- 2012 APS Division of Plasma Physics Annual Meeting, Providence, USA

Teaching Experience: 1040 hours

- 2018–2019 MSci project co-supervisor for two students, diagnosing electrical wire explosions. *100 hours.*
- 2018 UROP supervisor for three students, computational and experimental projects. *200 hours.*
- 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.*
- 2017–2018 Lead Demonstrator for first year undergraduate computing with Python. *16 hours.*
- 2017 UROP project supervisor, developing a continuous wave Faraday polarimeter. *80 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.*

2012 Problem session on plasma physics for NUF and SULI summer students at PPPL. *10 hours.*

Computer Skills

Python: Proficient (7+ years). C++: Significant experience (2+ years). Solidworks: Proficient (6+ years).

Languages

Mother tongue: English. CEFR for Languages: French (A1), German (A2).

Outreach and Engagement

2019 Author, "Surviving the Maelstrom Inside ITER", Fusion in Energy magazine, Fall 2019.

2017 Demonstrator, 'Making a Supernova' at the Science Museum Lates.

2017 Demonstrator, 'Making a Supernova' at the Royal Society Summer Science Exhibition.

2017 Demonstrator, 'Popomatic' laser-balloon interaction experiment at the Imperial Festival.

2015 Member, Imperial College delegation for the state visit of Chinese President Xi Jinping.

2014 Demonstrator, 'Set the Controls for the Heart of the Sun' at the Royal Society Summer Science Exhibition.

From 2013 Tours of the MAGPIE facility at Imperial College London, for undergraduates, visiting scientists, alumni and donors.

Clubs and Societies

2014–2017	Imperial College Caving Club	<i>Equipment Officer, President, Expedition Leader</i>
2011–2013	Princeton University Mountaineering Club	<i>Treasurer, Trip Leader</i>
2010–2011	Cambridge University LGBT Campaign	<i>President, Communications Officer</i>
2009–2011	Cambridge University Physics Society	<i>Publicity Officer, Speaker Liaison</i>