

Jack Davies Hare

Curriculum Vitae, April 2020

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Employment

- From 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. Experience with large scale collaborations, project management, neutronics and tomography.
- 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

- 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
Jun. 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. Leboutellier, **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, Montgenève, 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

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| 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> |