

# Jason Laurie

Dr Jason Laurie  
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## Research Interests

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Geophysical Fluid Dynamics; Quantum Fluids; Nonlinear Optics; Wave Turbulence; Computation of Rare Events and Transition Paths

## Employment

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2016 – Present	<b>Lecturer in Mathematics</b> , Aston University, United Kingdom
2012 – 2015	<b>Post-Doctoral Research Fellow</b> , Weizmann Institute of Science, Israel Advisor: Prof. Gregory Falkovich Topic: <i>Turbulence-Condensate Interaction in Two-Dimensional Turbulence</i>
2010 – 2012	<b>Post-Doctoral Research Fellow</b> , École Normale Supérieure de Lyon, France Advisor: Prof. Freddy Bouchet Topic: <i>Large Deviation and Instanton Theory for Bistability in Geophysical Turbulence</i>

## Education

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2006 – 2010	<b>Ph.D. in Mathematics</b> , University of Warwick, United Kingdom Awarded: 24th January 2011 Advisor: Prof. Sergey Nazarenko Thesis Title: <i>One-Dimensional Wave Turbulence in Six-Wave Systems</i>
2002 – 2006	<b>MMath in Mathematics</b> , University of Warwick, United Kingdom Grade: First Class with Honours Research Project: <i>Waves and Vortices in Bose-Einstein Condensates</i>

## Grants and Awards

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2017	Leader of the UK Fluids Network Special Interest Group (SIG) in Wave Turbulence (£12,000)
2012 – 2015	Dean of Faculty Post-Doctoral Research Fellowship (£60,000 over 3 years)
2012	HPC-Europa2 Transnational Access Grant (£3,000)
2010	ERCOFTAC's 9th Osbourne Reynolds Research Award
2006 – 2010	EPSRC Ph.D. Scholarship (£45,000 over 3.5 years)

## Research Impact

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Publications	15 Peer-Reviewed Journal Articles, 1 Book Chapter, 4 Conference Proceedings
Presentations	16 Invited Presentations, 9 Contributed Presentations, 9 Seminars, 1 Winter School Lecture
Indices	Total Citations > 360, $h$ -Index = 11, $i_{10}$ -Index = 11 (Google Scholar)

## Student Mentoring

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2017 – Present	<b>Karl Lydon</b> (MSc student), Aston University, United Kingdom
2016 – 2017	<b>Kieran Niner</b> (Final year BSc Mathematics student), Aston University, United Kingdom
2016 – 2017	<b>Rees Phillips</b> (Final year BSc Mathematics student), Aston University, United Kingdom
2012 – 2015	<b>Anna Frishman</b> (PhD student), Department of Physics of Complex Systems, Weizmann Institute of Science, Israel

## Teaching Experience

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2016 - 2017	<b>Lecturer</b> (Aston University): <i>AM10PB Probability</i> (33 hours, 100 students), <i>AM20CP Numerical Methods II</i> (33 hours, 80 students)
2014	<b>Winter School Course</b> (École de Physique des Houches): <i>Superfluid Turbulence</i>
2008-2010	<b>Teaching Assistant</b> (University of Warwick): <i>MA124 Mathematics by Computer</i> (20 hours, 30 students), <i>MA131 Analysis I</i> (20 hours, 40 students), <i>MA3D1 Fluid Dynamics</i> (10 hours, 50 students)

## Administrative Responsibilities

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Institutional	Organiser of Mathematics Tutorial Ambassador Scheme, Staff liaison to Aston's Mathletes Society
Workshop Organisation	<ul style="list-style-type: none"> <li>• <i>Statistics of Extreme and Singular Events in Spatially Extended Systems</i>, University of Warwick, United Kingdom, (July 2016)</li> <li>• <i>Wave Turbulence</i>, University of Warwick, United Kingdom, (May 2008)</li> <li>• <i>Nonlinear Optics</i>, University of Warwick, United Kingdom, (May 2008)</li> <li>• <i>Turbulence and Wave Turbulence</i>, joint between University of Warwick and University of Hull, United Kingdom, (September 2007)</li> </ul>
Journal Referee	Entropy, Journal of Computational Physics, Journal of Fluids, Physical Review Letters, Physical Review B, Physical Review E, Physics of Fluids, Physics Letters A, Proceedings of the Royal Society A, The European Physical Journal Plus
Technician	Taught Course Centre Access Grid Node, University of Warwick, UK
Memberships	EPSRC Associate Peer Review College, Institute of Physics IOP (Full Member)

## Additional Skills

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Languages	English (Mother Tongue), French (Intermediate), German (Intermediate)
Computational	C/C++, FORTRAN, MPI, OpenMP, Python, Julia, MATLAB, Mathematica

## References

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Prof. Sergey Nazarenko Mathematics Institute University of Warwick Coventry CV4 7AL UK s.v.nazarenko@warwick.ac.uk +44 (0)24 7652 8325	Prof. Freddy Bouchet Laboratoire de Physique École Normale Supérieure de Lyon Lyon 69007 France freddy.bouchet@ens-lyon.fr +33 (0)4 7272 8640	Prof. Gregory Falkovich Physics of Complex Systems Weizmann Institute of Science Rehovot 76100 Israel gregory.falkovich@weizmann.ac.il +972 (0)8 934 2830
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# Publication List

## Published Journal Articles

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15. J. Laurie, A. Chattopadhyay and D. Flower, “Protein Lipograms”, *Journal of Theoretical Biology*, **430**, 109-116, (2017)
14. A. Frishman, J. Laurie and G. Falkovich, “Jets or Vortices—What Flow are Generated by an Inverse Turbulent Cascade?”, *Physical Review Fluids*, **2**, 032602(R), (2017)
13. J. Laurie and A. W. Baggaley, “A Note on the Propagation of Quantized Vortex Rings Through a Quantum Turbulence Tangle: Energy Transport or Energy Dissipation?”, *Journal of Low Temperature Physics*, **180**, No. 1-2, 95-108, (2015)
12. J. Laurie and A. W. Baggaley, “Reconnection Dynamics and Mutual Friction in Quantum Turbulence”, *Journal of Low Temperature Physics*, **180**, No. 1-2, 82-94, (2015)
11. J. Laurie and F. Bouchet, “Computation of Rare Transitions in the Barotropic Quasi-Geostrophic Equations”, *New Journal of Physics*, **17**, 015009, (2015)
10. A. W. Baggaley and J. Laurie, “Thermal Counterflow in a Periodic Channel with Solid Boundaries”, *Journal of Low Temperature Physics*, **178**, No. 1-2, 35-52, (2015)
9. J. Laurie, G. Boffetta, G. Falkovich, I. Kolokolov and V. Lebedev, “Universal Profile of the Vortex Condensate in Two-Dimensional Turbulence”, *Physical Review Letters*, **113**, 254503, (2014)
8. F. Bouchet, J. Laurie and O. Zaboronski, “Langevin Dynamics, Large Deviations and Instantons for the Quasi-Geostrophic Model and Two-Dimensional Euler Equations”, *Journal of Statistical Physics*, **156**, 1066-1092, (2014)
7. A. W. Baggaley and J. Laurie, “The Kelvin-Wave Cascade in the Vortex Filament Model”, *Physical Review B*, **89**, 014504, (2014)
6. A. W. Baggaley, J. Laurie and C. F. Barenghi, “Vortex-Density Fluctuations, Energy Spectra and Vortical Regions in Superfluid Turbulence”, *Physical Review Letters*, **109**, 205304, (2012)
5. J. Laurie, U. Bortolozzo, S. Nazarenko and S. Residori, “One-Dimensional Optical Wave Turbulence: Experiment and Theory”, *Physics Reports*, **514**, No. 4, 121-175, (2012)
4. L. Boué, R. Dasgupta, J. Laurie, V. S. L’vov, S. Nazarenko and I. Procaccia, “Exact Solution for the Energy Spectrum of Kelvin-Wave Turbulence in Superfluids”, *Physical Review B*, **84**, No. 6, 064516, (2011)
3. J. Laurie, V. S. L’vov, S. Nazarenko and O. Rudenko, “Interaction of Kelvin Waves and Non-Locality of the Energy Transfer in Superfluids”, *Physical Review B*, **81**, No. 10, 104526, (2010)
2. U. Bortolozzo, J. Laurie, S. Nazarenko and S. Residori, “Optical Wave Turbulence and the Condensation of Light”, *Journal of the Optical Society of America B*, **26**, No. 12, 2280-2284, (2009)
1. G. Boffetta, A. Celani, D. Dezzani, J. Laurie and S. Nazarenko, “Modeling Kelvin Wave Cascades in Superfluid Helium”, *Journal of Low Temperature Physics*, **156**, No. 3-6, 193-214, (2009)

## Book Chapters

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1. J. Laurie, U. Bortolozzo, S. Nazarenko and S. Residori  
“Optical Wave Turbulence and Wave Condensation in a Nonlinear Optical Experiment”  
*Chapter in Localized States in Physics: Solitons and Patterns*, Springer-Verlag, (2010)

## Conference Proceedings

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4. F. Bouchet and J. Laurie, “Statistical Mechanics Approaches to Self-Organization of 2D Flows: Fifty Years After, Where Does Onsager’s Route Lead to?”, *RIMS Kôkyûroku*, **1798**, 42-58, (2012)
3. F. Bouchet and J. Laurie, “Instanton Trajectories for Random Transitions in Turbulent Flows”, *15th Rencontre du Non-Linéaire*, 49-56, (2012)
2. F. Bouchet, J. Laurie, and O. Zaboronski, “On the Statistical Mechanics of the 2D Stochastic Euler Equation”, *Journal of Physics: Conference Series*, **318**, 042020, (2011)
1. F. Bouchet, J. Laurie, and O. Zaboronski, “Control and Instanton Trajectories for Random Transitions in Turbulent Flows”, *Journal of Physics: Conference Series*, **318**, 022041, (2011)

# Presentation List

## Invited Presentations

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16. Quantum Turbulence Workshop, Florida State University, United States of America, (April 2017)
15. Statistics of Extreme and Singular Events in Spatially Extended Systems, University of Warwick, United Kingdom, (July 2016)
14. Extreme Events in the Earth and Planetary Sciences, University of Warwick, United Kingdom, (July 2016)
13. Interpretation of Measurements in Superfluid Turbulence, CEA Saclay, France, (September 2015)
12. Quantum Gases, Fluids and Solids, University of São Carlos, Brazil, (August 2014)
11. Reconnection Events in Classical, Quantum and Magnetized Fluids, University of Glasgow, United Kingdom, (June 2014)
10. Turbulence and Amorphous Materials, Eilat, Israel, (November 2013)
9. Numerical Modeling and Theoretical Challenges in Atmospheric and Ocean Turbulence, École Normale Supérieure de Lyon, France, (October 2013)
8. Nonlinear Hydrodynamic Waves: Wave Interaction and Wave Turbulence, Université Paris Diderot, France, (October 2013)
7. Superfluid Turbulence from the Perspective of Numerics, École Normale Supérieure de Lyon, France, (November 2012)
6. Computation of Transitions Trajectories and Rare Events in Non-Equilibrium Systems, École Normale Supérieure de Lyon, France, (June 2012)
5. Non-linéarités, fluctuations et hétérogénéités, Institut Henri Poincaré, France, (October 2010)
4. Computation of Rare Events, École Normale Supérieure de Lyon, France, (June 2011)
3. ERCOFTAC's 8th Osborne Reynolds Research Award, Cranfield University, United Kingdom, (June 2010)
2. Topics in Quantum Turbulence, ICTP, Trieste, Italy, (March 2009)
1. Workshop on Nonlinear Optics, University of Warwick, United Kingdom, (May 2008)

## Contributed Presentations

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9. Fluctuation Driven Phenomena in Non-Equilibrium Statistical Mechanics, University of Warwick, United Kingdom, (September 2015)
8. Theoretical Advances in Planetary Flows and Climate Dynamics, Les Houches, France, (March 2015)
7. Weak Chaos and Weak Turbulence, MPI Dresden, Germany, (February 2014)
6. 14th European Turbulence Conference, École Normale Supérieure de Lyon, France, (September 2013)
5. XXXII Dynamics Days Europe, University of Gothenburg, Sweden, (September 2012)
4. IUTAM Symposium 2012: Understanding Common Aspects of Extreme Events in Fluids, University College Dublin, Ireland, (July 2012)
3. Wave Turbulence, Les Houches, France, (March 2012)

2. 13th European Turbulence Conference, Warsaw, Poland, (September 2011)
1. British Mathematical Colloquium, Edinburgh, United Kingdom, (April 2010)

## Seminars

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9. School of Mathematics, University of East Anglia, United Kingdom, (November 2016)
8. School of Mathematics and Statistics, Newcastle University, United Kingdom, (October 2016)
7. Institute of Oceanography, Universität Hamburg, Germany, (February 2016)
6. Department of Mathematics, Aston University, United Kingdom, (January 2016)
5. Department of Physics of Complex Systems, Weizmann Institute of Science, Israel, (November 2014)
4. Department of Physics of Complex Systems, Weizmann Institute of Science, Israel, (February 2013)
3. School of Mathematical Sciences, Queen Mary University of London, United Kingdom, (October 2012)
2. School of Mathematics and Statistics, Newcastle University, United Kingdom, (April 2012)
1. Laboratoire de Physique, École Normale Supérieure de Lyon, France, (November 2010)

## Summer/Winter School Lectures

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1. New Challenges In Turbulence Research III, École de Physique des Houches, France, (March 2014)