

Dr Jonathan Ben-Artzi

Research Areas	Spectral analysis, Analysis of Nonlinear PDEs, Kinetic theory, Smooth ergodic theory & continuous-time dynamical systems, Computational complexity in infinite dimensions	
Employment	Cardiff University , Cardiff, UK	Since September 2016
	<i>School of Mathematics</i> Reader (Associate Professor), since 2019 Senior Lecturer, 2016-2019 EPSRC Early Career Fellow, 2016-2022	
	Durham University , Durham, UK	July-September 2016
	Lecturer (Tenured Assistant Professor), <i>Department of Mathematical Sciences</i>	
	Imperial College London , London, UK	2014-2017
	Junior Research Fellow, <i>Department of Mathematics</i> (resigned 2016)	
	University of Cambridge , Cambridge, UK	2011-2014
	Research Associate jointly at: <i>Cambridge Centre for Analysis</i> <i>Department of Applied Mathematics and Theoretical Physics</i> Supernumerary Fellow, <i>Pembroke College</i>	
Qualifications	Brown University , Providence, Rhode Island, USA	
	Ph.D., Mathematics	May 2011
	Advisor: Walter A. Strauss	
	M.Sc., Applied Mathematics	May 2009
	M.Sc., Mathematics	May 2008
	Teaching Certificate	May 2008
	Hebrew University of Jerusalem , Jerusalem, Israel	
	B.Sc., Mathematics-Physics (dual degree)	June 2006
Fellowships, Grants & Awards	Marie Skłodowska-Curie Fellowship: €212,934 (ref. 885904) European Commission (role: supervisor of Dr Frank Rösler)	2020-2022
	LMS Research in Pairs (Scheme 4): £1200 (ref. 41817) London Mathematical Society (for visit of Prof. Stephen Pankavich)	November 2018
	Outstanding Contribution Award Cardiff University	October 2018
	Marie Skłodowska-Curie Fellowship: €195,455 (ref. 790623) European Commission (role: supervisor of Dr Junyong Zhang)	2018-2020
	SCoRE Cymru: £600 for visit of Dr Junyong Zhang (ref. SC17003) Welsh European Funding Office	April 2017
	EPSRC Early Career Fellowship: £977,978 (ref. EP/N020154/1) UK Engineering and Physical Sciences Research Council	2016-2022

Conference funding for the conference “*The Cauchy Problem in Kinetic Theory: Recent Progress in Collisionless Models*”, Imperial College London, September 2015:

- ❑ **LMS Conference Grant (Scheme 1): £7,000** (ref. 11443) March 2015
London Mathematical Society
- ❑ **EPSRC Platform Grant: £10,000** (ref. W031JB) February 2015
Department of Mathematics, Imperial College London

Junior Research Fellowship: £175,000 2014-2017
Imperial College London

Supernumerary Fellowship 2011-2013
Pembroke College, Cambridge

Outstanding Teaching Award May 2011
Department of Mathematics, Brown University

Young Researcher Travel Award April 2011
The Seventh IMACS Conference

Coline M. Makepeace Fellowship 2006-2007
Graduate School, Brown University

Submitted Papers

- 23. Universal algorithms for solving inverse spectral problems
(with M. Marletta and F. Rösler)
Preprint, arXiv:2203.13078, 26 pages
- 22. Asymptotic Growth and Decay of Two-Dimensional Symmetric Plasmas
(with B. Morisse and S. Pankavich)
Preprint, arXiv:2202.03717, 26 pages
- 21. Strichartz estimates for the Klein-Gordon equation in a conical singular space
(with F. Cacciafesta, A.-S. de Suzzoni and J. Zhang)
Preprint, arXiv:2007.05331, 44 pages
- 20. Averaging along degenerate flows on the annulus
(with B. Morisse)
Preprint, arXiv:1902.06681, 14 pages
- 19. Computing Spectra – On the Solvability Complexity Index Hierarchy and Towers of Algorithms
(with M. J. Colbrook, A. C. Hansen, O. Nevanlinna and M. Seidel)
Preprint, arXiv:1508.03280, 93 pages
- 18. The Solvability Complexity Index - Computer Science and Logic Meet Scientific Computing
(with A. C. Hansen, O. Nevanlinna and M. Seidel)
Preprint, https://jbenartzi.github.io/papers/SCI_STOC_Final.pdf, 15 pages

Publications

- 17. Computing scattering resonances
(with M. Marletta and F. Rösler)
J. Eur. Math. Soc. (JEMS), accepted, **arXiv:2006.03368**, 19 pages
- 16. Global Strichartz estimates for the Dirac equation on symmetric spaces
(with F. Cacciafesta, A.-S. de Suzzoni and J. Zhang)
Forum of Math., Sigma **10**(e25), 1-38 (2022)

15. Universal algorithms for computing spectra of periodic operators
(with M. Marletta and F. Rösler)
Numer. Math. **150**, 719-767 (2022)
14. A toy model for the relativistic Vlasov-Maxwell system
(with S. Pankavich and J. Zhang)
Kinetic & Related Models **15**(3), 341-354 (2022)
13. Computing the sound of the sea in a seashell
(with M. Marletta and F. Rösler)
Found. Comput. Math. (FoCM) **22**, 697-731 (2022)
12. Uniform convergence in von Neumann's ergodic theorem in the absence of a spectral gap
(with B. Morisse)
Ergod. Theor. Dyn. Syst. **41**(6), 1601-1611 (2021)
11. Weak Poincaré inequalities in the absence of spectral gaps
(with A. Einav)
Ann. Henri Poincaré **21**(2), 359-375 (2020)
10. Concentrating solutions of the relativistic Vlasov-Maxwell system
(with S. Calogero and S. Pankavich)
Commun. Math. Sci. **17**(2), 377-392 (2019)
9. Arbitrarily large solutions of the Vlasov-Poisson system
(with S. Calogero and S. Pankavich)
SIAM J. Math. Anal. **50**(4), 4311-4326 (2018)
8. Instabilities of the relativistic Vlasov-Maxwell system on unbounded domains
(with T. Holding)
SIAM J. Math. Anal. **49**(5), 4024-4063 (2017)
7. Moment bounds on the corrector of stochastic homogenization of non-symmetric elliptic finite difference equations (with D. Marahrens and S. Neukamm)
Commun. PDE **42**(2), 179-234 (2017)
6. Approximations of strongly continuous families of unbounded operators
(with T. Holding)
Commun. Math. Phys. **345**(2), 615-630 (2016)
5. Instabilities in kinetic theory and their relationship to the ergodic theorem
Contemp. Math. **653**, 25-40 (2015)
4. New barriers in complexity theory: On The Solvability Complexity Index and Towers of Algorithms
(with A. C. Hansen, O. Nevanlinna and M. Seidel)
C. R. Acad. Sci. **353**, 931-936 (2015)
3. On the spectrum of shear flows and uniform ergodic theorems
J. Funct. Anal. **267**, 299-322 (2014)
2. Instability of nonsymmetric nonmonotone equilibria of the Vlasov-Maxwell system
J. Math. Phys. **52**, 123703, pp. 1-21 (2011)
1. Instability of nonmonotone magnetic equilibria of the relativistic Vlasov-Maxwell system
Nonlinearity **24**, 3353-3389 (2011)

**Invited
Conference
Talks**

Mathematical aspects of the physics with non-self-adjoint operators Banff International Research Station, Alberta, Canada	July 2022
International Workshop on Operator Theory and its Applications: Special Session on Spectral Theory and Differential Operators Lancaster University, Lancaster, UK (online)	August 2021
Modélisation océan-atmosphère Université de Rennes 1, Rennes, France	September 2019
The 23rd Bi-Annual Mini-Workshop in Applied and Computational Mathematics Hebrew University of Jerusalem, Jerusalem, Israel	December 2018
South-West Network in Generalised Solutions for Nonlinear PDEs Cardiff University, Cardiff, UK	September 2017
Montréal Analysis Seminar McGill University, Montréal, Canada	April 2017
Workshop on Hilbert's Sixth Problem University of Leicester, Leicester, UK	May 2016
London Analysis Seminar University College London, London, UK	November 2015
Bath-WIMCS Analysis Day Cardiff University, Cardiff, UK	September 2015
Kinetic and Related Equations BIRS-CMO, Oaxaca, Mexico	July 2015
Complex Analysis & Dynamical Systems VII Nahariya, Israel	May 2015
Microlocal Day 5 Imperial College London, London, UK	January 2015
The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications: Special Session on Kinetic Models Madrid, Spain	July 2014
Mathematical Topics in Kinetic Theory University of Cambridge, Cambridge, UK	June 2013
Complex Analysis & Dynamical Systems VI Nahariya, Israel	May 2013
Probabilistic Methods in Kinetic Theory CIRM, Luminy, France	July 2011
The Seventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory University of Georgia, Athens, GA, USA	April 2011

**Event & Seminar
Organisation**

Organiser , Intradisciplinary Lecture Series, Cardiff University	2018- <i>present</i>
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	Co-organiser: South Wales Analysis and Probability Seminar (SWAP) Cardiff and Swansea Universities	2018-present
	<i>Joint organiser of a seminar series alternating between Cardiff and Swansea (3-4 times a year) focusing on analysis and probability with local and external speakers. Website: https://jbenartzi.github.io/SWAP/</i>	
	Organiser , Cardiff Informal Analysis & PDE Seminar, Cardiff University	2017-present
	Co-Organiser , Cardiff Analysis Online Seminar (CAOS), Cardiff University	2020-2022
	Organiser , Analysis Seminar, Cardiff University	2019-2020
	Workshop Organiser: “Small Scales and Homogenisation (SmaSH)” Cardiff University	June 2019
	<i>Jointly organised (with B. Morisse and F. Rösler) an international workshop with 10 invited speakers from around the world, and a total of 40 participants. Website: https://smash-workshop.github.io/</i>	
	Workshop Organiser: “An Analyst, a Geometer and a Probabilist Walk Into a Bar” Cardiff University	June 2018
	<i>Jointly organised (with B. Morisse) an international workshop with 11 invited speakers and a total of 40 participants. Website: https://jbenartzi.github.io/Conference-2018/index.html.</i>	
	Conference Organiser: “The Cauchy Problem in Kinetic Theory: Recent Progress in Collisionless Models” Imperial College London	September 2015
	<i>Served as the main organiser of an international conference of over 25 invited speakers from around the world, and a total of 50 participants. Obtained funding (see above), set up a website (https://jbenartzi.github.io/Conference-2015/index.html), produced a poster (available on the website) and handled all other administrative aspects.</i>	
	Co-organiser , Analysis Seminar, Imperial College London	2015-2016
	Local Organiser: “Mathematical Topics in Kinetic Theory” University of Cambridge	June 2013
Service	Organiser , PDE Seminar, University of Cambridge	2011-2014
	Organiser , Informal PDE Seminar, Brown University	2010-2011
	Special Issue Editor , <i>Mathematics</i> (journal)	2020
	<i>Editor of special issue “Modern Analysis and Partial Differential Equations”.</i>	
	Member of Internal Review Panel , Cardiff University	January 2020
	<i>Member of the Round 5 UKRI Future Leaders Fellowships Expression of Interest panel within the College of Physical Sciences and Engineering.</i>	
	Member of University Senate , Cardiff University	2019-2020
	Member of School Research Committee , School of Mathematics, Cardiff University	2019-2021
	Postdoc Rep , Department of Mathematics, Imperial College London	2014-2015
	<i>Responsible for representing postdocs of the mathematics department to the College, and organising career development and social events.</i>	

Grant Refereeing: Czech Science Foundation, UK Engineering and Physical Sciences Research Council, Research Grants Council of Hong Kong, Agence Nationale de la Recherche (France)

Journal Refereeing: Discrete and Continuous Dynamical Systems - Series A, Kinetic and Related Models, Rocky Mountain Journal of Mathematics, Journal of Functional Analysis, SIAM Journal on Mathematical Analysis, Communications in Partial Differential Equations, Communications in Mathematical Physics, Advances in Mathematics, Journal of Differential Equations, Journal of Computational and Applied Mathematics, Proceedings of the London Mathematical Society, Journal of Ocean Engineering and Marine Energy, Proceedings of the Royal Society of Edinburgh, Nonlinearity, Journal de Mathématiques Pures et Appliquées

Reviewer, Mathematical Reviews

2012-present

Postdoc Mentoring

Junyong Zhang, 2018-2020. Junyong received his PhD in 2011 under the supervision of Prof. Changxing Miao at the Institute of Applied Physics and Computational Mathematics in Beijing. Junyong was awarded a Marie Skłodowska-Curie Fellowship while in Cardiff. He is now an Associate Professor at the Beijing Institute of Technology.

Frank Rösler, 2018-2022. Frank received his PhD in 2018 under the supervision of Prof. Patrick Dondl at Durham/Freiburg Universities. Frank was awarded a Marie Skłodowska-Curie Fellowship while in Cardiff.

Baptiste Morisse, 2017-2020. Baptiste received his PhD in 2017 under the supervision of Dr Benjamin Texier at Université Paris-Diderot.

PhD Students

Alexei Stepanenko, 2018-2022. Alexei's thesis was entitled "Spectral approximation and eigenvalue bounds for differential operators", jointly supervised with Prof. Marco Marletta. Alexei went on to Cambridge University with a Fellowship awarded by the London Mathematical Society.

Thomas Holding, 2012-2016. Served as a junior doctoral supervisor. Thomas went on to a postdoctoral position with Prof. Martin Hairer (Imperial College London).

Undergraduate & Masters Student Supervision

Cardiff University, Cardiff, UK

Since 2016

Masters and Undergraduate

- ❑ Thomas Anquetil: "*Kinetic Theory*", Summer 2018

Imperial College London, London, UK

2014-2016

Masters and Undergraduate

- ❑ Maria del Valle Varo: "*Hilbert's Sixth Problem: From Micro to Macroscopic Descriptions*", Summer 2016
- ❑ Paul Ramond: "*Landau Damping: Physics vs Mathematics*", 2015-2016
- ❑ Wei Yu: "*Infinite-dimensional spaces, the spectral theorem and the ergodic theorem*", Summer 2015
- ❑ Charafeddine Mouzouni: "*Topics in existence, uniqueness and stability of solutions to Vlasov systems in Kinetic Theory*", Spring 2015

University of Cambridge, Cambridge, UK

2011-2014

Masters

- ❑ Zhuo Min Lim: "*Jeans' Theorem in Kinetic Theory*", 2013-2014
- ❑ Thomas Holding: "*Instability of the Vlasov-Maxwell system on unbounded domains*", 2012-2013
- ❑ Luca Calatroni: "*Linear stability and instability of plasmas*", 2011-2012

Teaching	Cardiff University , Cardiff, Wales, UK	Since 2016
	Undergraduate Teaching	
	❑ <i>Differential Geometry of Curves and Surfaces</i> (MA3010), Autumn 2018	
	Imperial College London , London, UK	2014-2016
	Postgraduate Teaching	
	❑ <i>Dispersive Equations</i> (taught jointly with Dr Arick Shao), Autumn 2015	
	Course taught via video conferencing at the <i>Taught Course Centre</i> , a joint postgraduate teaching centre between Bath, Bristol, Imperial College, Oxford and Warwick.	
	University of Cambridge , Cambridge, UK	2011-2014
	Postgraduate Teaching	
	❑ Supervision of Doctoral PDE course project " <i>Incompressible flows and the Beale-Kato-Majda criterion</i> ", 2011-2012	
	❑ Teaching Assistant for Doctoral course <i>Kinetic Theory</i> , Autumn 2011	
	Undergraduate Course Supervisions	
	❑ <i>Vector Calculus</i> , Spring 2012 & 2013	
	❑ <i>Numerical Analysis</i> , Spring 2013	
	❑ <i>Vectors and Matrices</i> , Autumn 2012	
	❑ <i>Methods</i> , Autumn 2011 & 2012	
	Brown University , Providence, Rhode Island, USA	2006-2011
	Undergraduate Teaching	
	❑ <i>Multivariable Calculus</i> (MA 0180), Autumn 2009 & Autumn 2010	
	❑ <i>Analytic Geometry and Calculus</i> (MA 0060), Spring 2009	
	❑ <i>Honors Multivariable Calculus</i> (MA 0350), Autumn 2008	
	Sheridan Center Teaching Certificate , Completed May 2008	
Seminar Talks	Brown University, Cardiff University, Columbia University, Hebrew University of Jerusalem, Imperial College London, Max Planck Institute Leipzig, McGill University, Princeton University, Technion-Israel Institute of Technology, Université Aix-Marseille, University of Bath, University of Bremen, University of Cambridge, University of Crete, University of Glasgow, University of Oxford, Université Paris Nord (13), University of Reading, University of Surrey, University of Sussex, University of Warwick.	
Academic Visits	Hebrew University of Jerusalem , Jerusalem, Israel: December 2018 (one week)	
	Max Planck Institute , Leipzig, Germany: March 2014 (one week), June 2013 (one week), April 2013 (one week), December 2012 (two weeks), April 2012 (one week), February 2012 (one week), January 2012 (one week), December 2011 (one week)	
	Université Paris 13 , Paris, France: November 2012 (one week)	
	Brown University , Providence, RI, USA: April 2017 (one week), March 2012 (one week)	

Memberships	London Mathematical Society , member	2014- <i>present</i>
	American Mathematical Society , member	2018- <i>present</i>
Contact Information	<div> <div> School of Mathematics Cardiff University Abacws Building Senghennydd Road Cardiff CF24 4AG Wales, United Kingdom </div> <div> <i>Email:</i> Ben-ArtziJ@cardiff.ac.uk <i>Webpage:</i> https://jbenartzi.github.io/ <i>Phone:</i> +44 (0)7760 581879 </div> </div>	