

Research Areas	ANALYSIS OF NONLINEAR PDES; KINETIC THEORY; SPECTRAL APPROXIMATION & COMPUTATION; SMOOTH ERGODIC THEORY & CONTINUOUS-TIME DYNAMICAL SYSTEMS; FUNCTIONAL INEQUALITIES	
Employment	<div><div>Cardiff University, Cardiff, UK</div><div><div>School of Mathematics</div><div>Reader (Associate Professor), since 2019</div><div>Senior Lecturer, 2016-2019</div><div>EPSRC Early Career Fellow, 2016-2022</div></div></div> <div><div>Imperial College London, London, UK</div><div>Junior Research Fellow, <i>Department of Mathematics</i> (resigned 2016)</div></div> <div><div>University of Cambridge, Cambridge, UK</div><div>Research Associate jointly at:<div><div><i>Cambridge Centre for Analysis</i></div><div><i>Department of Applied Mathematics and Theoretical Physics</i></div></div><div>Supernumerary Fellow, <i>Pembroke College</i></div></div></div>	<div>Since September 2016</div> <div>2014-2017</div> <div>2011-2014</div>
Education	<div><div>Brown University, Providence, Rhode Island, USA</div><div><div>Ph.D., Mathematics</div><div>Advisor: Walter A. Strauss</div><div>M.Sc., Applied Mathematics</div><div>M.Sc., Mathematics</div><div>Teaching Certificate</div></div></div> <div><div>Hebrew University of Jerusalem, Jerusalem, Israel</div><div>B.Sc., Mathematics-Physics (dual degree)</div></div>	<div>May 2011</div> <div>May 2009</div> <div>May 2008</div> <div>May 2008</div> <div>June 2006</div>
Fellowships, Grants & Awards	<div><div>Marie Skłodowska-Curie Fellowship: €212,934 (ref. 885904, score: 93.2%)</div><div>European Commission (role: supervisor of Dr Frank Rösler)</div></div> <div><div>Marie Skłodowska-Curie Fellowship: €195,455 (ref. 790623, score: 100%)</div><div>European Commission (role: supervisor of Dr Junyong Zhang)</div></div> <div><div>LMS Research in Pairs (Scheme 4): £1200 (ref. 41817)</div><div>London Mathematical Society (for visit of Prof. Stephen Pankavich)</div></div> <div><div>Outstanding Contribution Award</div><div>Cardiff University</div></div> <div><div>SCoRE Cymru: £600 for visit of Dr Junyong Zhang (ref. SC17003)</div><div>Welsh European Funding Office</div></div> <div><div>EPSRC Early Career Fellowship: £977,978 (ref. EP/N020154/1)</div><div>UK Engineering and Physical Sciences Research Council</div></div> <div><div>Conference funding for the conference “The Cauchy Problem in Kinetic Theory: Recent Progress in Collisionless Models”, Imperial College London, September 2015:</div></div>	<div>2020-2022</div> <div>2018-2020</div> <div>November 2018</div> <div>October 2018</div> <div>April 2017</div> <div>2016-2022</div>

<input type="checkbox"/> LMS Conference Grant (Scheme 1): £7,000 (ref. 11443) London Mathematical Society	March 2015
<input type="checkbox"/> EPSRC Platform Grant: £10,000 (ref. W031JB) Department of Mathematics, Imperial College London	February 2015
Junior Research Fellowship: £175,000 Imperial College London	2014-2017
Supernumerary Fellowship Pembroke College, Cambridge	2011-2013
Outstanding Teaching Award Department of Mathematics, Brown University	May 2011
Young Researcher Travel Award The Seventh IMACS Conference	April 2011
Coline M. Makepeace Fellowship Graduate School, Brown University	2006-2007

Preprints

23. 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
22. Averaging along degenerate flows on the annulus
(with B. Morisse)
Preprint, **arXiv:1902.06681**, 14 pages
21. 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
20. 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

In Revision

19. On the complexity of the inverse Sturm-Liouville problem
(with M. Marletta and F. Rösler)
Pure and Applied Analysis (in revision), arXiv:2203.13078, 27 pages

Publications

18. Asymptotic Growth and Decay of Two-Dimensional Symmetric Plasmas
(with B. Morisse and S. Pankavich)
Kinetic and Related Models, online first, <https://doi.org/10.3934/krm.2023015>
17. Computing scattering resonances
(with M. Marletta and F. Rösler)
J. Eur. Math. Soc. (JEMS), online first, <https://doi.org/10.4171/jems/1258>
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 and 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)

Computer Code

Code for Publication 19 (inverse Sturm-Liouville problem):

https://github.com/jbenartzi/inverse_SCI

Code for Publication 17 (quantum scattering resonances):

https://github.com/jbenartzi/Resonances_SCI_1d

Code for Publication 15 (spectra of periodic operators, 2D):
<https://github.com/jbenartzi/PeriodicSpectra2d>

Code for Publication 15 (spectra of periodic operators, 1D):
<https://github.com/jbenartzi/PeriodicSpectra>

Code for Publication 13 (classical scattering resonances):
<https://github.com/jbenartzi/SeashellComp>

**Invited
Conference
Talks**

Stability Analysis for Nonlinear PDEs OxPDE, University of Oxford, Oxford, UK	August 2022
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-present
	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 link.</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 and a total of 40 participants. Website.</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.</i>	
	Conference Organiser: "The Cauchy Problem in Kinetic Theory: Recent Progress in Collisionless Models" Imperial College London	September 2015
	<i>Jointly organised (with M. Hadžić and S. Pankavich) an international conference with 25 invited speakers and a total of 50 participants. Website.</i>	
	Co-organiser , Analysis Seminar, Imperial College London	2015-2016
	Local Organiser: "Mathematical Topics in Kinetic Theory" University of Cambridge	June 2013
	Organiser , PDE Seminar, University of Cambridge	2011-2014
	Organiser , Informal PDE Seminar, Brown University	2010-2011
Service	Special Issue Editor , <i>Mathematics</i> (journal) <i>Editor of special issue "Modern Analysis and Partial Differential Equations".</i>	2020
	Member of Internal Review Panel , Cardiff University <i>Member of the Round 5 UKRI Future Leaders Fellowships Expression of Interest panel within the College</i>	January 2020

Member of University Senate , Cardiff University	2019-2020
Member of School Research Committee , School of Mathematics, Cardiff University	2019-2021
Postdoc Representative , 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, Mathematische Annalen, Foundations of Computational Mathematics

Reviewer, Mathematical Reviews 2012-present

Postdoc Mentoring

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. He is now a researcher at the University of Bern.

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 a Professor at the Beijing Institute of Technology.

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

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. Thomas' thesis was entitled "Asymptotic Behaviour and Derivation of Mean Field Models" for which I served as a junior doctoral supervisor under Profs. José A. Carrillo and Clément Mouhot. Thomas went on to a postdoctoral position with Prof. Martin Hairer.

Undergraduate & Masters Student Supervision

Cardiff University , Cardiff, UK	Since 2016
<input type="checkbox"/> Oliver Nelson: <i>"The Axiom of Choice and the Banach-Tarski Paradox"</i> , 2022-2023 <input type="checkbox"/> Ronak Sachin Chavan: <i>"Human Factors in Process Safety Events"</i> , Summer 2022 <input type="checkbox"/> Thomas Anquetil: <i>"Kinetic Theory"</i> , Summer 2018	
Imperial College London , London, UK	2014-2016
<input type="checkbox"/> Maria del Valle Varo: <i>"Hilbert's Sixth Problem: From Micro to Macroscopic Descriptions"</i> , Summer 2016 <input type="checkbox"/> Paul Ramond: <i>"Landau Damping: Physics vs Mathematics"</i> , 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

- ❑ 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 & Masters Teaching

- ❑ *Partial Differential Equations* (MA3016), Autumn 2022
- ❑ *Differential Geometry of Curves and Surfaces* (MA3010), Autumn 2018

Imperial College London, London, UK 2014-2016

Doctoral Teaching

- ❑ *Dispersive Equations* (taught jointly with Dr Arick Shao), Autumn 2015

Course taught via video conferencing at the *Taught Course Centre*, a joint postgraduate teaching centre between Bath, Bristol, Imperial College, Oxford and Warwick.

University of Cambridge, Cambridge, UK 2011-2014

Doctoral Teaching

- ❑ Supervision of Doctoral PDE course project “Incompressible flows and the Beale-Kato-Majda criterion”, 2011-2012
- ❑ Teaching Assistant for Doctoral course *Kinetic Theory*, Autumn 2011

Undergraduate Course Supervisions

- ❑ *Vector Calculus*, Spring 2012 & 2013
- ❑ *Numerical Analysis*, Spring 2013
- ❑ *Vectors and Matrices*, Autumn 2012
- ❑ *Methods*, Autumn 2011 & 2012

Brown University, Providence, Rhode Island, USA 2006-2011

Undergraduate Teaching

- ❑ *Multivariable Calculus* (MA 0180), Autumn 2009 & Autumn 2010
- ❑ *Analytic Geometry and Calculus* (MA 0060), Spring 2009
- ❑ *Honors Multivariable Calculus* (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, Université de Tours, University of Warwick.

Academic Visits	Hebrew University of Jerusalem , Jerusalem, Israel: December 2018 (one week)		
	Brown University , Providence, RI, USA: April 2017 (one week), March 2012 (one week)		
	Durham University , Durham, UK: June 2016 (one month)		
	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)		
Memberships	London Mathematical Society , member		2014- <i>present</i>
	American Mathematical Society , member		2018- <i>present</i>
Contact Information	School of Mathematics <i>Email:</i> Ben-ArtziJ@cardiff.ac.uk Cardiff University <i>Webpage:</i> https://jbenartzi.github.io/ Abacws Building Senghennydd Road Cardiff CF24 4AG Wales, United Kingdom		