

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

<input type="checkbox"/> <b>LMS Conference Grant (Scheme 1): £7,000</b> (ref. 11443) London Mathematical Society	March 2015
<input type="checkbox"/> <b>EPSRC Platform Grant: £10,000</b> (ref. W031JB) Department of Mathematics, Imperial College London	February 2015
<b>Junior Research Fellowship: £175,000</b> Imperial College London	2014-2017
<b>Supernumerary Fellowship</b> Pembroke College, Cambridge	2011-2013
<b>Outstanding Teaching Award</b> Department of Mathematics, Brown University	May 2011
<b>Young Researcher Travel Award</b> The Seventh IMACS Conference	April 2011
<b>Coline M. Makepeace Fellowship</b> 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](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 & Related Models* (accepted), arXiv:2202.03717, 26 pages
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 & 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**

**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

<b>Event &amp; Seminar Organisation</b>	<b>International Workshop on Operator Theory and its Applications: Special Session on Spectral Theory and Differential Operators</b> Lancaster University, Lancaster, UK (online)	August 2021
	<b>Modélisation océan-atmosphère</b> Université de Rennes 1, Rennes, France	September 2019
	<b>The 23rd Bi-Annual Mini-Workshop in Applied and Computational Mathematics</b> Hebrew University of Jerusalem, Jerusalem, Israel	December 2018
	<b>South-West Network in Generalised Solutions for Nonlinear PDEs</b> Cardiff University, Cardiff, UK	September 2017
	<b>Montréal Analysis Seminar</b> McGill University, Montréal, Canada	April 2017
	<b>Workshop on Hilbert's Sixth Problem</b> University of Leicester, Leicester, UK	May 2016
	<b>London Analysis Seminar</b> University College London, London, UK	November 2015
	<b>Bath-WIMCS Analysis Day</b> Cardiff University, Cardiff, UK	September 2015
	<b>Kinetic and Related Equations</b> BIRS-CMO, Oaxaca, Mexico	July 2015
	<b>Complex Analysis &amp; Dynamical Systems VII</b> Nahariya, Israel	May 2015
	<b>Microlocal Day 5</b> Imperial College London, London, UK	January 2015
	<b>The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications: Special Session on Kinetic Models</b> Madrid, Spain	July 2014
	<b>Mathematical Topics in Kinetic Theory</b> University of Cambridge, Cambridge, UK	June 2013
	<b>Complex Analysis &amp; Dynamical Systems VI</b> Nahariya, Israel	May 2013
	<b>Probabilistic Methods in Kinetic Theory</b> CIRM, Luminy, France	July 2011
	<b>The Seventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory</b> University of Georgia, Athens, GA, USA	April 2011
<b>Event &amp; Seminar Organisation</b>	<b>Organiser</b> , Intradisciplinary Lecture Series, Cardiff University	2018- <i>present</i>
	<b>Co-organiser: South Wales Analysis and Probability Seminar (SWAP)</b> Cardiff and Swansea Universities	2018- <i>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](#).*

**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

*Jointly organised (with B. Morisse and F. Rösler) an international workshop with 10 invited speakers and a total of 40 participants. Website. [Website](#).*

**Workshop Organiser: “An Analyst, a Geometer and a Probabilist Walk Into a Bar”**

Cardiff University June 2018

*Jointly organised (with B. Morisse) an international workshop with 11 invited speakers and a total of 40 participants. Website. [Website](#).*

**Conference Organiser: “The Cauchy Problem in Kinetic Theory: Recent Progress in Collisionless Models”**

Imperial College London September 2015

*Jointly organised (with M. Hadžić and S. Pankavich) an international conference with 25 invited speakers and a total of 50 participants. Website. [Website](#).*

**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**, *Mathematics* (journal) 2020

*Editor of special issue “Modern Analysis and Partial Differential Equations”.*

**Member of Internal Review Panel**, Cardiff University January 2020

*Member of the Round 5 UKRI Future Leaders Fellowships Expression of Interest panel within the College of Physical Sciences and Engineering.*

**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

*Responsible for representing postdocs of the mathematics department to the College, and organising career development and social events.*

**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 Mathemat-

cal 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

- ❑ Oliver Nelson: *"The Axiom of Choice and the Banach-Tarski Paradox"*, 2022-2023
- ❑ Ronak Sachin Chavan: *"Human Factors in Process Safety Events"*, Summer 2022
- ❑ Thomas Anquetil: *"Kinetic Theory"*, Summer 2018

**Imperial College London**, London, UK

2014-2016

- ❑ 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

- ❑ 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, 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-*present*

**American Mathematical Society**, member

2018-*present*

**Contact  
Information**

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Cardiff University  
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