Dr Jonathan Ben-Artzi

Research Areas Spectral analysis, Ergodic theory, Analysis of Nonlinear PDEs, Kinetic theory, Computational complexity in infinite dimensions

Employment

Cardiff University, Cardiff, UK — Since September 2016
Senior Lecturer (Associate Professor), *School of Mathematics*
EPSRC Early Career Fellow, 2016-2021

Durham University, Durham, UK — July-September 2016
Lecturer (Tenured Assistant Professor), *Department of Mathematical Sciences*

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*

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

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

Marie Skłodowska-Curie Fellowship: €195,455 (ref. 790623) — 2018-2020
European Commission (role: supervisor of Dr Junyong Zhang)

EPSRC Early Career Fellowship: £977,978 (ref. EP/N020154/1) — 2016-2021
UK Engineering and Physical Sciences Research Council

SCoRE Cymru: £600 for visit of Dr Junyong Zhang (ref. SC17003) — April 2017
Welsh European Funding Office

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

Publications & Submitted Papers

13. Can everything be computed? - On the Solvability Complexity Index and Towers of Algorithms (with A. C. Hansen, O. Nevanlinna and M. Seidel)
Submitted, **arXiv:1508.03280**, 79 pages

12. 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/Files/SCI_STOC_Final.pdf`, 15 pages

11. Concentrating solutions of the relativistic Vlasov-Maxwell system
(with S. Calogero and S. Pankavich)
Submitted, **arXiv:1807.02801**, 19 pages

10. Weak Poincaré inequalities in absence of spectral gaps
(with A. Einav)
Submitted, **arXiv:1805.08557**, 14 pages

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

The 23rd Bi-Annual Mini-Workshop in Applied and Computational Mathematics
Hebrew University if 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

BIRS-CMO Workshop: Kinetic and Related Equations
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

Service

Organiser, Intradisciplinary Lecture Series, Cardiff University — 2018-*present*

Co-organiser: South Wales Analysis and Probability Seminar (SWAP)
Cardiff and Swansea Universities 2018-*present*

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 from around the world, and a total of 40 participants. Website: `https://jbenartzi.github.io/Conference-2018/index.html`.

Conference Organiser: "The Cauchy Problem in Kinetic Theory: Recent Progress in Collisionless Models"
Imperial College London September 2015

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.*

Co-organiser, Analysis Seminar, Imperial College London 2015-2016

Postdoc Rep, 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.

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

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

Reviewer, Mathematical Reviews 2012-*present*

Postdoc Mentoring

Junyong Zhang, 2018-2021. 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.

Frank Rösler, 2018-2020. Frank received his PhD in 2018 under the supervision of Prof. Patrick Dondl at Durham/Freiburg Universities.

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

PhD Students

Alexei Stepanenko, 2018-2022. Alexei's project involves rigorous aspects of spectral approximation & computation. Joint supervision with Prof. Marco Marletta.

Student Supervision

Imperial College London, London, UK 2014-2016

Doctoral

- Thomas Holding, 2012-2016

Served as a junior doctoral supervisor and coauthored papers [6] and [9] above. Thomas went on to a postdoctoral position with Prof. Martin Hairer (Imperial).

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

Imperial College London, London, UK 2014-2016

Postgraduate 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

Postgraduate Teaching

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

Undergraduate Course Supervisions

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

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 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

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)

PROFESSIONAL ORGANISATIONS

London Mathematical Society, member 2014-*present*

American Mathematical Society, member 2018-*present*