

EUGEN VĂRVĂRUCĂ

CURRICULUM VITAE

CONTACT INFORMATION

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RESEARCH INTERESTS

Mathematical Analysis (Nonlinear Functional Analysis, Complex and Harmonic Analysis, Geometric Analysis);
Nonlinear Partial Differential Equations (Free-Boundary Problems, Water Waves)

EDUCATION

2002–2005 University of Bath, UK
PhD Mathematics, December 2005
Thesis Title: “Singularities in Free Boundaries”
Thesis Advisor: Professor John F. Toland FRS
2001–2003 “Al. I. Cuza” University, Iași, Romania
MSc Mathematics, June 2003
1997–2001 “Al. I. Cuza” University, Iași, Romania
BSc Mathematics, June 2001

EMPLOYMENT

October 2012 – present	Associate Professor in Mathematics, Department of Mathematics and Statistics, University of Reading, UK
June 2010 – September 2012	Lecturer in Mathematics, Department of Mathematics and Statistics, University of Reading, UK
October 2008 – May 2010	Chapman Fellow (Research Associate), Department of Mathematics, Imperial College London, UK
January 2006 – September 2008	Research Officer, Department of Mathematical Sciences, University of Bath, UK

PRIZES AND AWARDS

2012 **Whitehead Prize of the London Mathematical Society**, the citation for which reads “*for ground-breaking analysis of free boundary problems for linear and nonlinear elliptic equations, with important applications, in arbitrary dimensions*”
1997 Silver Medal at the International Mathematical Olympiad (IMO), Argentina
1993–1997 First Prize at the Romanian National Mathematical Olympiad

PUBLICATIONS

- E. Varvaruca and G. S. Weiss, *Singularities of steady axisymmetric free surface flows with gravity*, Comm. Pure Appl. Math., **67** (2014), 1263–1306.
- E. Varvaruca and G. S. Weiss, *The Stokes conjecture for waves with vorticity*, Ann. Inst. H. Poincaré Anal. Non Linéaire, **29** (2012), 861–885.
- E. Varvaruca and A. Zarnescu, *Equivalence of weak formulations of the steady water waves equations*, Phil. Trans. Roy. Soc. London, **370** (2012), 1703–1719.
- E. Varvaruca and G. S. Weiss, *A geometric approach to generalized Stokes conjectures*, Acta Math., **206** (2011), 363–403.
- A. Constantin and E. Varvaruca, *Steady periodic water waves with constant vorticity: regularity and local bifurcation*, Arch. Rational Mech. Analysis, **199** (2011), 33–67.
- E. Varvaruca, *On the existence of extreme waves and the Stokes conjecture with vorticity*, J. Differential Equations, **246** (2009), 4043–4076.
- E. Varvaruca, *Bernoulli free-boundary problems in strip-like domains and a property of permanent waves on water of finite depth*, Proc. Roy. Soc. Edinburgh Sect. A, **138** (2008), 1345–1362.
- E. Varvaruca, *On some properties of travelling water waves with vorticity*, SIAM J. Math. Anal., **39** (2008), 1686–1692.
- E. Varvaruca, *Some geometric and analytic properties of solutions of Bernoulli free-boundary problems*, Interfaces Free Bound., **9** (2007), 367–381.
- E. Varvaruca, *Singularities of Bernoulli free boundaries*, Comm. Partial Differential Equations, **31** (2006), 1451–1477.
- E. Varvaruca, *Exact rates of convergence as $t \rightarrow +\infty$ for solutions of nonlinear evolution equations*, J. Evol. Equ., **4** (2004), 543–565.
- E. Varvaruca, *Backward uniqueness and unique continuation for evolution inequalities governed by subdifferentials*, Nonlinear Funct. Anal. Appl., **7** (2002), 269–284.

INVITED PARTICIPATION IN LONG-TERM RESEARCH PROGRAMMES

- “Theory of Water Waves”, Isaac Newton Institute, Cambridge, July–August 2014
- “Free Boundary Problems and Related Topics”, Isaac Newton Institute, Cambridge, January–July 2014
- “Nonlinear Water Waves”, Erwin Schrödinger Institute, Vienna, Austria, April–June 2011
- “Wave Motion”, Mittag-Leffler Institute, Stockholm, Sweden, September–December 2005

INVITED CONFERENCE/WORKSHOP TALKS

- Workshop “Mathematical Theory of Water Waves”, MFO Oberwolfach, Germany, April 2015
- Spitalfields Day “Advances in the Mathematics of Water Waves”, Isaac Newton Institute, Cambridge, July 2014
- Workshop “Recent Developments and Challenges in Interface and Free Boundary Problems”, University of Warwick, March 2014
- Workshop “Recent Advances in Nonlinear PDE and Calculus of Variations”, University of Reading, February 2014
- Introductory School to the Programme “Free Boundary Problems and Related Topics” (**4 hour lecture course on “Geometric Approaches to Water Waves and Free Surface Flows”**), Isaac Newton Institute, Cambridge, January 2014
- LMS–EPSRC Short Instructional Course “Modern Nonlinear PDE Methods in Fluid Dynamics” (**2 hour lecture course on “Bifurcation Theory in the context of Steady Water Waves”**), University of Reading, July 2013

- Joint International Meeting of the AMS and the Romanian Mathematical Society, "1 Decembrie 1918" University of Alba Iulia, Romania, June 2013
- Workshop "Riemann–Hilbert Problems and their Applications", University of Reading, May 2013
- Workshop "Nonlinear Analysis of Water Waves", University College, Cork, Ireland, April 2013
- Workshop "Nonlinear Waves and Interface Problems", Lund, Sweden, June 2012
- Conference "Free Boundary Problems", Frauenchiemsee, Germany, June 2012
- Workshop "Mathematical Aspects of Water Waves", King's College, London, March 2012
- "Equadiff 2011" Conference, Loughborough University, August 2011
- Erwin Schrödinger Institute Workshop on Surface Water Waves, Vienna, Austria, June 2011
- NSF/CBMS Conference "Nonlinear Water Waves with Applications to Wave-Current Interactions and Tsunamis", University of Texas–PanAmerican, Edinburg TX, USA, May 2010
- Workshop "Partial Differential Equations", MFO Oberwolfach, Germany, August 2009
- Workshop "Wave Motion", MFO Oberwolfach, Germany, February 2009
- Workshop "Large Amplitude Internal Waves", International Centre for Mathematical Sciences, Edinburgh, December 2008
- AIMS Conference on Dynamical Systems and Differential Equations, Arlington TX, USA, May 2008
- Mathematics 2005, BMC & BAMC, Liverpool, April 2005

INVITED SEMINAR TALKS

- Paris–London Analysis Seminar, Paris, France, June 2014
- Analysis Seminar, University of Warwick, February 2013
- Partial Differential Equations Seminar, University of Bath, February 2013
- London Analysis Seminar, Imperial College, London, January 2012
- Analysis Seminar, Heriot–Watt University, Edinburgh, November 2011
- Analysis Seminar, University of Birmingham, October 2011
- Analysis Seminar, Cardiff University, November 2010
- Mathematics and Applications Seminar, University of Sussex, Brighton, November 2010
- Applied Mathematics Seminar, University of East Anglia, Norwich, November 2010
- Analysis Seminar, University of Warwick, February 2010
- Analysis Seminar, EPFL, Lausanne, Switzerland, November 2009
- Erwin Schrödinger Institute Seminar, Vienna, Austria, October 2009
- Nonlinear Mathematics Seminar, University of Surrey, Guildford, May 2009
- Applied Mathematics and Mathematical Physics Colloquium, Imperial College, London, December 2008
- Partial Differential Equations Seminar, University of Oxford, December 2008
- Partial Differential Equations Seminar, Massachusetts Institute of Technology, Cambridge MA, USA, May 2008
- Partial Differential Equations Seminar, Brown University, Providence RI, USA, May 2008
- Partial Differential Equations Seminar, Trinity College, Dublin, Ireland, November 2007
- Mittag-Leffler Institute Seminar, Stockholm, Sweden, October 2005
- London Analysis Seminar, King's College, London, October 2004

SUPERVISION OF PHD STUDENTS

- Peter de Boeck, 2010–2014, PhD degree awarded December 2014, thesis title: “Steady Capillary-Gravity Waves with Constant Vorticity”

TEACHING-RELATED ACTIVITIES

2010–2015 Department of Mathematics and Statistics, University of Reading:

- **lectures** in
 - MA3TLA *Topology and Linear Analysis* (taught three times),
 - MA37L *Analysis and Topology* (taught twice),
 - MA4XD *Modern Analysis*,
 - MA3FA1 *Functional Analysis I*,
 - MA4FA1 *Functional Analysis I (reading course)*,
 - MA2VAD *Vector Analysis and Differential Equations* (only the second half of the module, devoted to the theory of Ordinary Differential Equations);
- tutorials for various modules in Analysis, Calculus, Differential Equations, Linear Algebra;
- supervision of several 3rd year and one 4th year undergraduate projects;
- active contribution between 2011 and 2013 (recognized by the award in 2012 of a University of Reading Lump Sum Award of £1,000 for “outstanding achievement or excellence of a short-term nature, which is worthy of particular note”) to the **redesign of the undergraduate Mathematics curriculum**.

2008–2010 Department of Mathematics, Imperial College London:

- **lectures** (twice) in M3P7/M4P7 *Functional Analysis*;
- problem classes for various modules in Calculus, Differential Equations;
- supervision of several first and second year undergraduate projects.

2002–2008 Department of Mathematics, University of Bath: problem classes (tutorials) for various modules in Analysis, Calculus, Differential Equations, and Algebra.

OTHER PROFESSIONAL ACTIVITIES

- member of the London Mathematical Society;
- referee for *Bulletin of the American Mathematical Society*, *Communications on Pure and Applied Mathematics*, *Archive for Rational Mechanics and Analysis*, *SIAM Journal on Mathematical Analysis*, *SIAM Journal on Applied Mathematics*, *Journal of Fluid Mechanics*, *IMA Journal of Applied Mathematics*;
- reviewer for *Mathematical Reviews*;
- organizer of the Analysis Seminar in the Department of Mathematics and Statistics at the University of Reading between 2011 and 2013.

REFEREES

- Professor Adrian Constantin, Department of Mathematics, King’s College London, UK, adrian.constantin@kcl.ac.uk
- Professor John F. Toland FRS, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, jft26@newton.ac.uk
- Professor Georg S. Weiss, Department of Mathematics, University of Duisburg–Essen, Germany, weiss@math.uni-due.de