

Curriculum Vitae

Name: **Kirill Cherednichenko**

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Born: 18 June 1975, Sevastopol, Ukraine

Nationality: United Kingdom, Russia

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Employment

October 2006 – now: Lecturer in Mathematics (permanent), School of Mathematics, Cardiff University

October 2005 – September 2006: Postdoctoral Research Associate, Department of Applied Mathematics and Theoretical Physics, University of Cambridge

October 2001 – September 2005: Junior Research Fellow in Mathematics, St. John's College, University of Oxford

Education and qualifications

March 2009: Postgraduate Certificate in University Teaching and Learning, Cardiff University

November 1998 – November 2001 : PhD Course in Mathematics under the supervision of V. P. Smyshlyaev, University of Bath. PhD awarded in December 2001. Thesis title: "Higher-order and non-local effects in homogenisation of periodic media."

July 1998 : First Class Diploma Degree with Distinction in Mathematics (equivalent of MSc) from St. Petersburg State University, Russia. Research project (MSc Dissertation) under the supervision of V. M. Babich. Dissertation title: "Asymptotic expansion of Fock's type for solutions of linear ordinary differential equations of second order with a singular point and a large parameter."

September 1993 – July 1998 : Undergraduate studies at the Department of Mathematics and Mechanics, St. Petersburg State University, Russia. Division of Mathematics, specialisation in Partial Differential Equations and Applications.

Grants, awards and other distinctions

Engineering and Physical Sciences Research Council (EPSRC), Responsive Mode Grant: March 2008 (Project title: "Variational convergence for nonlinear high-contrast homogenisation problems". Value: £183.6K)

Cardiff University, International Collaboration Fund Award — Early Stage Researcher: May 2008 (For a visit by Prof. V. V. Zhikov. Value: £3.2K)

London Mathematical Society (LMS), Conference Grant: February 2007 (Conference organised: "Perturbed periodic PDE, problems with singular boundaries and their numerical aspects". Value: £2.5K)

LMS, Conference Grant: July 2008 (Conference organised: "South-West UK Analysis Meeting". Value: £2.5K)

LMS, Conference Grant: February 2008 (Conference organised: “Non-classical, boundary and localisation phenomena in mathematical homogenisation” Value: £3.1K)

Wales Institute of Computational and Mathematical Sciences (WIMCS), Conference Grant, April 2008 (Conference organised: “Non-classical, boundary and localisation phenomena in mathematical homogenisation” Value: £0.9K)

LMS, Collaborative Grant: October 2007 (Collaborator: P. Padilla. Value: £0.6K).

LMS, Collaborative Grant: March 2006 (Collaborators: V. M. Babich, V. V. Zhikov. Value: £0.5K)

Junior Research Fellowship, St. John’s College, University of Oxford, UK: September 2001 – September 2005.

Overseas Research Studentship (ORS), CVCP, U. K.: November 1998 – November 2001.

Soros Studentship in Mathematics: March 1997 – October 1998.

Research interests

- Rigorous analysis of problems in continuum mechanics
- Homogenisation of partial differential equations and integral functionals
- Nonlinear partial differential equations
- Applications of homogenisation to the mechanics of composite materials
- Scale interaction effects (for example strain-gradient and non-local effects) in the behaviour of heterogeneous media
- Mathematical methods for wave propagation phenomena in solid mechanics and electromagnetism
- Spectral analysis and wave localisation phenomena
- Variational methods in the mechanics of “microstructured” media
- Homogenised description of dislocation ensembles in plasticity, modelling and analysis

Invited talks at mathematics departments

Aberystwyth, Bath (twice), Birmingham, Cambridge, Cardiff, Imperial College London, Liverpool, TU Munich

Invited conference talks

July 2009, The 7th International ISAAC Congress, University College London — “Two-scale Γ -convergence and its applications to homogenisation of nonlinear high-contrast problems” (with M. Cherdantsev)

September 2007, Workshop on Microscopic Models of Plastic Evolution, University of Warwick — “Plastic shear of a thin film via homogenisation of the dislocation transport”

July 2007, “Waves 2007” Conference, University of Reading, and April 2007, British Mathematics Colloquium, Swansea University — “Spectral asymptotic analysis for periodic Maxwell operator via Bloch-wave homogenisation” (with S. Guenneau)

September 2005, Conference on “Multi-scale problems: modelling, analysis and applications”, University of Bath — “Variational and asymptotic approaches to higher-order effects in periodic composites via homogenisation”.

April 2005, British Applied Mathematics Colloquium, University of Liverpool — “Propagation of Scholte-Gogoladze waves along a fluid-solid interface of arbitrary shape”.

June 2003, Diffraction Days, Steklov Mathematical Institute, St. Petersburg, Russia — “On calculation of the density of states for periodic operators” (with P. Padilla).

April 2002, British Applied Mathematics Colloquium, University of Warwick — “New developments on non-local homogenised constitutive relations for periodic composite media”.

April 2001, Workshop on Multiscale Methods in Nonlinear PDE, Isaac Newton Institute, Cambridge — “On full asymptotic expansion of the solutions of nonlinear periodic rapidly oscillating problems”.

April 2000, British Applied Mathematics Colloquium, UMIST, Manchester — “Non-local homogenised limits for periodic composite media” (with V. P. Smyshlyaev and V. V. Zhikov).

July 1999, The 4th International Congress on Industrial and Applied Mathematics, Edinburgh — “On derivation of the “higher order” effects in the overall behaviour of heterogeneous media from microstructure” (with V. P. Smyshlyaev).

April 1999, British Applied Mathematics Colloquium, University of Bath — “Uniform asymptotics of Fock’s type for differential equations with a large parameter” (with V. M. Babich).

January 1998, Petrovsky Conference, Moscow State University, Russia — “On Fock’s ansatz” (with V. M. Babich).

June 1997, Diffraction Days, Steklov Mathematical Institute, St. Petersburg, Russia — Fock’s ansatz and its generalizations” (with V. M. Babich).

Conferences organised

January 2009: “South-West UK Analysis Meeting”, University of Bath

August 2008: “Non-classical, boundary and localisation phenomena in mathematical homogenisation”, Cardiff School of Mathematics

September 2007: “Perturbed periodic PDE, problems with singular boundaries and their numerical aspects”, Cardiff School of Mathematics

Research supervision

September 2008 – November 2009: MPhil student (A. Burgmann). Project title: “Averaging for spectral problems in high-contrast materials”

September 2008 – June 2009: 3rd year undergraduate project (D. Hughes). Project title: “Calculus of variations and its applications in the mechanics of solids”

September 2008 – June 2009: 3rd year undergraduate project (N. Prowse). Project title: “Ray theory and its applications in mechanics”

Research visits

August 2007: Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, UNAM, Mexico.

December 2003: Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, UNAM, Mexico.

January 2003: Departement de Mecanique et Genie Civil, Université Montpellier II, France.

November 2001: Departement de Mecanique et Genie Civil, Université Montpellier II, France.

September – December 1999: Isaac Newton Institute for Mathematical Sciences, Cambridge, UK.

November 1998 : Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany.

Teaching experience

December 2008 – June 2010: University lecturer for the course “Calculus of Variations” (3rd year), Cardiff University

December 2007 – June 2008: University lecturer for the course “Calculus Methods I” (1st year), Cardiff University

December 2006 – June 2010: University lecturer for the course “Series and Transforms” (2nd year), Cardiff University

October 2004 – January 2005: University lecturer for the course “Function Spaces for Applications” (4th year and MSc), University of Oxford

January – May 2002: Practical classes for Section C (4th year) students of the University of Oxford (Calculus of variations)

October – December 1999: Undergraduate supervisions for first-year students at the University of Cambridge (Numbers and sets; Quantum mechanics)

January – May 1999, January – May 2000, October – December 2000: Teaching assistant (tutorials) for the University of Bath (Matrices and multivariate calculus; Functions, differentiation and analytic geometry; Vectors and applications)

February – May 1997: Practical classes for third-year undergraduate students at the Physics Faculty of St. Petersburg State University, St. Petersburg, Russia. (Complex analysis)

Teaching interests

Calculus, including linear algebra; Advanced mathematical analysis, including real analysis and complex analysis; Functional analysis; Function spaces; Spectral operator theory; Ordinary differential equations; Topology; Analytic geometry; Differential geometry; Riemannian geometry; Partial differential equations; Partial differential equations and applications; Asymptotic methods for partial differential equations; Calculus of variations; Nonlinear partial differential equations; Mathematical methods for continuum mechanics; Solid mechanics, Quantum mechanics, Electromagnetism, Wave phenomena

Academic administration

August 2008 – now: Member of the WIMCS Analysis Cluster Steering Committee

November 2007 – now: Chair of Pure and Applied Mathematics Subject Board, Cardiff School of Mathematics

February – May 2008: Working Party on Undergraduate Mathematics Modules, Cardiff School of Mathematics

October 2007 – now: Personal tutoring (currently 24 undergraduate students), Cardiff School of Mathematics

February 2008 – now: Secretary of the Year Two Examination Board, Cardiff School of Mathematics

7 February 2010