

# Curriculum Vitae of Vassili (Vasily) N. Kolokoltsov

## 1. GENERAL INFORMATION

Present Position: Professor

Address: Department of Statistics, University of Warwick, CV4 7AL, UK

email: v.kolokoltsov@warwick.ac.uk

Date of birth: 8th August 1959, place of birth: Peking, China

Nationality: Russian

Married, with four children

Languages: English (fluent), German, French, Spanish (small talk), Russian (native)

Membership in Professional Bodies and Professional Associations:

Member of the New York Academy of Sciences (1995- )

Member of the London Mathematical Society (2000- )

Associate member in ZIF (Center for Interdisciplinary research, University Bielefeld, Germany): Forschungsgruppe Stochastic Dynamics (2012- )

Associate member in IPI RAN (Institute of Problems of Informatics of the Russian Academy of Science) (2011- )

Associate member in HSE (Higher School of Economics), Moscow (2018- )

Associate member in St. Petersburg University (2018- )

## 2. ACADEMIC QUALIFICATIONS

Full Doctor in Mathematics and Physics from the Steklov Mathematical Institute of the Russian Academy of Science

Graduation date: July 1993

Ph.D in Mathematics from Moscow State University

Graduation date: March 1985

University Diploma with distinction in Mathematics (M.Sc-level) from Moscow State University, Faculty of Mechanics and Mathematics

Graduation date: June 1981

## 3. EMPLOYMENT HISTORY

June 2006- Reader in Probability (from June 2012 Professor) at the University of Warwick, Department of Statistics

Jan.-Jun. 2006 Visiting Professor at INRIA Rocquencourt, France

Autumn 2004 Visiting Professor at Universidad Autonoma Metropolitana (UAM), Mexico

2004-2010 (honorary position) Professor at Moscow Economic Institute

2002-2004 (part-time position) Leading researcher at the Institute of the Information Transmission Problems of the Russian Academy of Sciences

2001-2005 Professor in Applied Mathematics in the Nottingham Trent University, UK  
 1996-2001 Reader in Mathematics in the Nottingham Trent University, UK  
 1995-1996 Research Fellow at Ruhr University Bochum, Germany  
 1995-1995 Research Fellow, Ecole des Mines de Nantes, Dep. Automatic Control, France  
 1994-2002 (part-time position) Major Researcher, Moscow Institute of New Technologies, Mathematical Modeling Department, Moscow, Russia  
 1993-1994 Alexander v. Humboldt Research Fellow, Mathematical Institute, Ruhr University Bochum, Germany  
 1988-1994 Associate professor, Moscow Institute of Electronics and Mathematics (MIEM), Applied Mathematics Department, Moscow, Russia  
 1984-1988 Scientific researcher, Inst. of Physical and Technical Problems, Moscow, Russia

#### 4. TEACHING and ADMINISTRATION

(a) (1988-1993) Moscow Institute of Electronic Machine Design and Moscow State University: 'Optimization Theory', 'Mathematical Models in Economics and Biology', 'Equations of Mathematical Physics', 'Asymptotic Methods for Partial Differential Equations', 'Numerical Methods', and also supervised MSc-project students in Applied Mathematics

(b) (1996-2005) Nottingham Trent University: 'Mathematics and Statistics' for HND/HNC Electrical and Electronic Engineering and B.Eng Civil Engineering, 'Information Theory and Stochastic Processes', 'Information Technology', 'Mathematical Methods' and 'Game Theory' for B.Sc in Mathematics for Information Technology

(c) (fall 2004) - Universidad Autonoma Metropolitana, Mexico: 'Functional Analysis': a semester course for postgraduates (in Spanish)

(d) (2006-) - University of Warwick: '*Brownian motion*', '*Mathematical methods in finances*' and '*Dynamic Stochastic Control*' for the fourth year (integrated masters), '*Advanced Probability*' for the third year and '*Probability AB*' (introductory module for the first year) on Math, MORSE and MathStats degrees; I have supervised lots (more than 30 in Warwick alone) of Master's dissertations from the MMORSE degree, MSc in Statistics, MSc in Financial Mathematics, MSc in Complexity Science, and in particular, group projects in financial statistics.

(e) I gave several invited short courses for students of various universities including 'Introduction to Financial Mathematics' (March 2012) and 'Advanced Financial Mathematics' (March 2013) in the Petrozavodsk University (Korelia, Russia), 'Introduction to nonlinear Markov processes' (May 2012) in Linnaeus University (Växjö, Sweden), 'Introduction to Financial Mathematics' (June 2014) in the Yakutsk University (Yakutia, Russia), 'Continuous time Random Walks (CTRW) and Fractional Calculus' (November 2014) in Bilbao University (Spain), 'Brownian motion' (March 2017, Torino), 'Brownian motion and Markov processes' (March 2018, Torino), 'Nonlinear Markov processes and

games' (June 2018) in Wuhan, China, Game Theory (March 2017 and March 2019) in Warwick, 'Introduction to Financial Mathematics' (November 2018) in the HSE, Moscow, 'Information systems' (October 2018) in St. Petersburg University, 'Probabilistic methods for solving fractional PDEs' (May 2018) in the Summer school and conference on nonlocal operators, Bilbao.

(f) My administration experience in Warwick includes: 1) The Director of Post Graduate Studies (2019- ) 2) The Deputy Head of Research in the Department of Statistics (2014 -2018) 3) The chair of the Departmental Research Committee (2010-2012), 4) Course leader and admission tutor of the Warwick MSc in Statistics degree (2006-2007), 5) Senior associate (co-director) of the Warwick Complexity Doctoral Training Center (2006-2013), 6) Dealing with undergraduate publicity and undergraduate handbook (2006-2008), 7) Organizing final year research projects for MMORSE students, including the moderation of assessment, 8) Organizing Probability at Warwick (PaW) research seminar 'Midlands Probability Theory Seminar', 9) Acting as invigilator and senior invigilator on the exams, 10) Member of the departmental promotion committee (2012- ), 11) Reviewer for staff on the Annual Academic Review (Performance - Development Review), 12) Organizing open days for prospective students, 13) Editing the Departmental Newsletter

## 5. RESEARCH

My general interests lie in probability and stochastic processes, mathematical physics, differential equations and analysis, optimization and games with applications to business, biology and finances.

### (a) **Monographs:**

- [1] V. P. Maslov, V. N. Kolokoltsov. *Idempotent analysis and its application to Optimal control* (in Russian). Moscow, Nauka, 1994.
- [2] V. N. Kolokoltsov, V. P. Maslov. *Idempotent analysis and its applications*. Kluwer Publishing House, 1997.
- [3] V. N. Kolokoltsov. *Semiclassical Analysis for Diffusions and Stochastic Processes*. Springer Lecture Notes Math., v. 1724, Springer 2000.
- [4] V. N. Kolokoltsov, O. A. Malafeyev. *Introduction to the analysis of many agent systems of competition and cooperation* (in Russian). St. Petersburg Univ. Press, 2007. Sec Ed. 'Lan' Publisher, St. Petersburg, 2012.
- [5] V. N. Kolokoltsov, O. A. Malafeyev. *Understanding Game Theory*. World Scientific 2010.
- [6] V. N. Kolokoltsov. *Nonlinear Markov processes and kinetic equations*. Cambridge Tracks in Mathematics 182, Cambridge Univ. Press, 2010. See the review of Prof. D. Applebaum in Bull. London Math. Soc. (2011) 43(6): 1245-1247.
- [7] V. N. Kolokoltsov. *Mathematical Analysis of Financial Markets. Probability Theory and Financial Mathematics. A brief introduction*. (In two languages: English and Russian). Moscow Economic Institute, Moscow 2010. ISBN 978-5-904073-03-9.

- [8] V. N. Kolokoltsov. *Markov processes, semigroups and generators*. DeGruyter Studies in Mathematics v. 38, DeGruyter, 2011.
- [9] P. Bernhard, J. Engwerda, B. Roorda, J.M. Schumacher, V. N. Kolokoltsov, P. Saint-Pierre and J.-P. Aubin. *The Interval Market Model in Mathematical Finance: Game-Theoretic Methods*. Birkhäuser, 2012. My contribution is Part 4: Game-theoretic analysis of rainbow options in incomplete markets, p. 217-290.
- [10] V. N. Kolokoltsov and O. A. Malafeyev. *Many Agent Games in Socio-economic Systems: Corruption, Inspection, Coalition Building, Network Growth, Security*. Springer Nature, 2019.
- [11] V. N. Kolokoltsov. *Differential equations on measures and functional spaces*. Birkhäuser, 2019 (to appear).

(b) **Edited volumes:**

R. Ball, V. Kolokoltsov and R. MacKay (Eds.). *Complexity Science. The Warwick Master's Course*. London Mathematical Society Lecture Notes Series, v. 408, Cambridge University Press, 2013 (446 pp). My personal part: Chapter 6. *Stochastic Methods in Economics and Finance*, p. 316-386.

(c) **Main Papers:**

- [1] V.N. Kolokoltsov. *Geodesic flows on two-dimensional manifolds with additional quadratic in velocity integral*. *Izv. Akad. Nauk USSR*, **46** (1982), 994-1010.
- [2] V.N. Kolokoltsov. *New examples of manifolds all of whose geodesics are closed*. *Vestnik Moskovskogo Universiteta*, **4** (1984), 80-82.
- [3] V.N. Kolokoltsov, V.P. Maslov. *The general form of the endomorphisms in the space of continuous functions with values in a numerical semiring*. *Sov. Math. Dokl.* **36** (1988), 55-59.
- [4] V.N. Kolokoltsov, V.P. Maslov. *The Cauchy problem for the homogeneous Bellman equation*. *Sov. Math. Dokl.* **36** (1988), 326-330.
- [5] V.N. Kolokoltsov, D.R. Lebedev. *Infinite series of local conservation laws of Miura type for higher Benny equations*. *Uspekhi Mat. Nauk* **43** (1988), 193-194. Engl. transl. in *Sov. Math. Surveys*.
- [6] V.N. Kolokoltsov, V.P. Maslov. *Idempotent analysis as an apparatus of optimal control theory 1*. *Funkz. Anal. i Pril.* **23:1** (1989), 1-14. Engl. transl. in *Functional Analysis and Appl.*
- [7] V.N. Kolokoltsov, V.P. Maslov. *Idempotent analysis as an apparatus of optimal control theory 2*. *Funkz. Anal. i Pril.* **23:4** (1989), 53-56. Engl. transl. in *Functional Analysis and Appl.*
- [8] V.N. Kolokoltsov. *Turnpikes and infinite extremals in Markovian decision processes*. *Matemat. Zametki (in Russian)* **46:4** (1989), 118-120.

- [9] V.N. Kolokoltsov. *Maslov's index in infinite-dimensional symplectic geometry*. Matemat. Zametki (in Russian) **48:6** (1990), 64-68.
- [10] V.N. Kolokoltsov. *Maslov's arithmetic in general topology*. In: V.V. Fedorchuk et al. (Eds.) "Geometry, Topology and Applications" (in Russian), Moscow Inst. of Instrument Making, Moscow (1990), 64-68.
- [11] S.Yu. Dobrokhotov, V.N. Kolokoltsov, V.P. Maslov. *The splitting of the low lying energy levels of the Schrödinger operator and the asymptotics of the fundamental solution of the equation  $hu_t = (h^2\Delta/2 - V(x))u$* . Teoret. i Mat. Fizika **87:3** (1991), 323-375. Engl. transl. in Theor. Math. Physics.
- [12] V.P. Belavkin, V.N. Kolokoltsov. *Quasyclassical asymptotics of quantum stochastic equations*. Teoret. i Matem. Fizika **89:2** (1991), 163-177. Engl. transl. in Theor. Math. Physics.
- [13] V.N. Kolokoltsov. *Quasyclassical solutions of the Belavkin quantum filtering equation*. Matemat. Zametki **50:5** (1991), 153-156. Engl. transl. in Mathematical Notes.
- [14] V.N. Kolokoltsov. *Introduction of a new Maslov-type currency (coupons) as a means of solving a market game under non-equilibrium prices*. DAN 320:6 (1991), 1310-1314. Engl. Transl. Sov. Math. Dokl. **44:2** (1992), 624-629.
- [15] V.N. Kolokoltsov. *The stochastic Bellman equation as a nonlinear equation in Maslov spaces. Perturbation theory*. Dokl. Akad. Nauk **323:2** (1992), 223-228. Engl. transl. in Sov. Math. Dokl. **45:2** (1992), 294-300.
- [16] V.N. Kolokoltsov, V.P. Maslov. *The differential Bellman equation and the Pontriagin maximum principle for multicriterial optimization problem*. Dokl. Akad. Nauk **324:1** (1992), 29-34. Engl. transl. in Sov. Math. Dokl.
- [17] S.Yu. Dobrokhotov, V.N. Kolokoltsov, V.P. Maslov. *Quantization of the Bellman Equation, Exponential Asymptotics and Tunneling*. Advances in Soviet Mathematics **13** (1992), Idempotent Analysis, Ed. V.P. Maslov, S.N. Samborski, 1-46.
- [18] V.N. Kolokoltsov. *On linear, Additive, and Homogeneous Operators in Idempotent Analysis*. Advances in Soviet Mathematics **13** (1992), Idempotent Analysis, Ed. V.P.Maslov et S.N. Samborski, 87-101.
- [19] V.N. Kolokoltsov. *On the asymptotics of the low lying eigenvalues and eigenfunctions of the Schrödinger operator*. Dokl. Akad. Nauk **328:6** (1993), 649-653. Engl. transl. in Sov. Math. Dokl.
- [20] S.Yu. Dobrokhotov, V.N. Kolokoltsov. *Splitting amplitudes of the lowest energy levels of the Schrödinger operator with double-well potential*. Teoret. i Matem. Fizika **94:3** (1993), 426-434. Engl. transl. in Theor. Math. Phys.
- [21] V.N. Kolokoltsov. *Estimates of exactness for Laplace Integrals*. Trudy Steklov Mat. Inst. **203** (1994) "Chosen questions of Math. Phys. and Analysis", 113-115.
- [22] S.Yu. Dobrokhotov, V.N. Kolokoltsov, V.M. Olive. *Quasimodes of the diffusion operator  $-\epsilon\Delta + V(x)\frac{\partial}{\partial x}$ , corresponding to asymptotically stable limit cycles of the field  $V(x)$* . Aportaciones Matemáticas. Serie Notas de Investigaci'on **11**. III Simposio de Probabilidada y Procesos Estocásticos. Sociedad Matemática Mexicana (1994), 81-89.

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- [26] S.Yu. Dobrokhotov, V.N. Kolokoltsov, V.M. Olive. *Asymptotic stable invariant manifolds of the vector field  $V(x)$  and quasimodes of the operator  $V(x)\nabla - \epsilon\Delta$* . Matem. Zametki **58:2** (1995), 301-306. Engl. transl. in Math. Notes.
- [27] V.N. Kolokoltsov, K. Makarov. *Asymptotic Spectral Analysis of the Small Diffusion Operator and Life Times of the Diffusion Process*. Russian Journal Math. Phys. **4:3** (1996), 341-360.
- [28] V.N. Kolokoltsov. *Stochastic Hamilton-Jacobi-Bellman equation and stochastic Hamiltonian systems*. Journ. Contr. and Dynamic systems, **2:3** (1996), 299-319.
- [29] S. Albeverio, V.N. Kolokoltsov, O.G. Smolyanov. *Représentation des solutions de l'équation de Belavkin pour la mesure quantique par une version rigoureuse de la formule d'intégration fonctionnelle de Menski*. C.R. Acad. Sci. Paris, ser.1 **323:6** (1996), 661-664.
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- [34] V.N. Kolokoltsov. *Localization and analytic properties of the simplest quantum filtering equation*. Rev. Math. Phys. **10: 6** (1998), 801-828.
- [35] V.N. Kolokoltsov. *Non expansive maps and option pricing theory*. Kibernetica **34:6** (1998), 713-724.
- [36] S. Albeverio, A. Hilbert, V.N. Kolokoltsov. *Estimates uniform in time for the transition probability of diffusion with small drift and for stochastically perturbed Newton equations*. J. Theor. Probability **12:3** (1999), 293-300.
- [37] V.N. Kolokoltsov. *Stochastic Hamilton-Jacoby-Bellman equation and Stochastic method WKB*. Proc. Intern. Workshop "Idempotency", Bristol, October 1994 (Ed. J Gunawardena), Cambridge Univ. Press 1998, 285-302.

- [38] V.N. Kolokoltsov, V.P. Maslov. *New differential equation for the dynamics of the Pareto sets*. Proc. Intern. Workshop "Idempotency", Bristol, October 1994 (Ed. J. Gunawardena), Cambridge Univ. Press 1998, 322-330.
- [39] V.N. Kolokoltsov. *Long time behavior of continuously observed and controlled quantum systems (a study of the Belavkin quantum filtering equation)*. In: Quantum Probability Communications, QP-PQ, V. 10, Ed. R.L. Hudson, J.M. Lindsay, World Scientific, Singapore (1998), 229-243.
- [40] V.N. Kolokoltsov, O.A. Malafeev. *A turnpike theorem in conflict-control processes with many participants*. In: O.Malafeev (Ed.) Conflict Models in Economics and Finances. St. Petersburg Univ. Press, 1997 (in Russian), 57-62.
- [41] V.N. Kolokoltsov. *Idempotent Structures in Optimisation*. Proc. Intern. Conf. devoted to the 90-th anniversary of L.S. Pontryagin, v. 4, VINITI, Moscow (1999), 118-174. Engl. transl. J. Math. Sci., NY **104:1** (2001), 847-880.
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- [43] V.N. Kolokoltsov. *Symmetric Stable Laws and Stable-like Jump-Diffusions*. Proc. London Math. Soc. **3 (80)** (2000), 725-768.
- [44] S. Albeverio, A. Hilbert and V. Kolokoltsov. *Sur le Comportement Asymptotique du Noyau Associé á une Diffusion Dégénéré*. C.R. Math. Rep. Acad. Sci. Canada. **22:4** (2000), 151-159.
- [45] V. Kolokoltsov, V. Korolev, V. Uchaikin. *Fractional Stable Distributions*. Journal of Mathematical Sciences **105:6** (2001), 2570-2577.
- [46] V.N. Kolokoltsov. *Small diffusion and fast dying out asymptotics for superprocesses as non-Hamiltonian quasi-classics for evolution equations*. Electronic Journal of Probability <http://www.math.washington.edu/ejpecp/> **6** (2001), paper 21.
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- [49] V.N. Kolokoltsov. *Mathematics of the Feynmann path integral*. Proc. of the International Mathematical conference FILOMAT 2001, University of Nis, FILOMAT **15** (2001), 293-312.
- [50] V.P. Belavkin, V.N. Kolokoltsov. *Stochastic evolution as interaction representation of a boundary value problem for Dirac type equation*. Infinite Dimensional Analysis, Quantum Probability and Related Fields **5:1** (2002), 61-92.
- [51] V.N. Kolokoltsov, R.L. Schilling, A.E. Tyukov. *Transience and non-explosion of certain stochastic Newtonian systems*. Electronic Journal of Probability <http://www.math.washington.edu/ejpecp/> **7** (2002), Paper 19.

- [52] M. Akian, S. Gaubert, V.N. Kolokoltsov. *Invertibility of Functional Galois Connections*. C. R. Acad. Science Paris, Ser. I, **335**. (2002), 1-6.
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- [55] V. N. Kolokoltsov. *On the singular Schrödinger equations with magnetic fields*. Matem. Zbornik **194:6** (2003), 105-126 (in Russian). Engl. transl. Sbornik Mathematics, p. 897-918.
- [56] V.N. Kolokoltsov, A.E. Tyukov. *Small time and semiclassical asymptotics for stochastic heat equation driven by Lévy noise*. Stochastics and Stochastics Reports **75** (1-2) (2003), 1-38.
- [57] V.N. Kolokoltsov. *Measure-valued limits of interacting particle systems with  $k$ -nary interactions I. One-dimensional limits*. Probability Theory Related Fields **126** (2003), 364-394.
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- [61] V.N. Kolokoltsov. *On Markov processes with decomposable pseudo-differential generators*. Stochastics and Stochastics Reports **76:1** (2004), 1-44.
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- [63] V. Kolokoltsov. *Hydrodynamic limit of coagulation-fragmentation type models of  $k$ -nary interacting particles*. Journal of Statistical Physics **115**, 5/6 (2004), 1621-1653.
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- [66] V.N. Kolokoltsov. Path integration: connecting pure jump and Wiener processes. In: Waymire, J. Duan (Eds.). "Probability and Partial Differential Equations in Modern Applied Mathematics", The IMA Volumes in Mathematics and its Applications, v. 140 (2005), p. 163-180.
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- [69] V. Kolokoltsov. *Kinetic equations for the pure jump models of  $k$ -nary interacting particle systems*. *Markov Processes and Related Fields* **12** (2006), 95-138.
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- [72] V.E. Bening, V. Yu. Korolev, S. Koksharov, V. N. Kolokoltsov. Limit theorems for continuous-time random walks in the double-array limit scheme. *J. Math. Sci. (N. Y.)* **146:4** (2007), 5959–5976.
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- [94] V. Kolokoltsov and M. Veretennikova. Fractional Hamilton Jacobi Bellman equations for scaled limits of controlled Continuous Time Random Walks. *Communications in Applied and Industrial Mathematics* **6:1** (2014), e-484. DOI: 10.1685/journal.caim.484 <http://caim.simai.eu/index.php/caim/article/view/484/PDF>
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- [97] Vassili Kolokoltsov. On fully mixed and multidimensional extensions of the Caputo and Riemann-Liouville derivatives, related Markov processes and fractional differential equations. *Fract. Calc. Appl. Anal.* 18:4 (2015), 1039 - 1073. <http://arxiv.org/abs/1501.03925>.
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- [101] V. N. Kolokoltsov and M Veretennikova. The fractional Hamilton-Jacobi-Bellman equation. *Journal of Applied Nonlinear Dynamics* 6:1 (2017), 4556.
- [102] Vassili Kolokoltsov. The evolutionary game of pressure (or interference), resistance and collaboration (2014). <http://arxiv.org/abs/1412.1269>. *MOR (Mathematics of Operations Research)*, 42 (2017), no. 4, 915944.
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- [104] S. Katsikas, V. Kolokoltsov and W. Yang. Evolutionary inspection and corruption games. *Games (MDPI journals)* 2016, 7(4), 31; doi:10.3390/g7040031 <http://www.mdpi.com/2074336/7/4/31/html>
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- [108] M. E. Hernandez-Hernandez, V. N. Kolokoltsov and L. Toniazzi. Generalised Fractional Evolution Equations of Caputo Type. *Chaos Solitons Fractals* 102 (2017), 184196.
- [109] A. Cecchin and V. N. Kolokoltsov. Evolutionary game of coalition building under external pressure [arXiv:1705.08160](https://arxiv.org/abs/1705.08160). *Annals of ISDG* (2017), 71-106.
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- [114] Kolokoltsov V. N., Troeva M. S. Regularity and Sensitivity for McKean-Vlasov type SPDEs generated by stable-like processes. *Issues of Analysis*. Vol. 7 (25), No. 2, 2018, p.69-81.
- [115] V. Kolokoltsov and M. Troeva. On Mean Field Games with Common Noise based on Stable-Like Processes. To appear in *SOIC*.
- [116] V. Kolokoltsov and M. Troeva. On the mean field games with common noise and the McKean-Vlasov SPDEs. [arXiv:1506.04594](https://arxiv.org/abs/1506.04594). *Stochastic Analysis and Applications*. Published on-line April 2019 <https://doi.org/10.1080/07362994.2019.1592690>

(d) Some other publications and preprints.

V. N. Kolokoltsov.  $SC$ -geodesic flows on a sphere with additional first integral quadratic in velocity. Manuscript (in Russian) *VINITI* 20.08.84, no. 5924-84, 30 pp.

V. N. Kolokoltsov. Polynomial integrals of geodesic flows on compact surfaces. Thesis of PhD dissertation (in Russian), Moscow State University, 1985, 11 pp.

V. N. Kolokoltsov and D. R. Lebedev. Quasiclassical deformation of the KP hierarchy and the long waves equations of Benny. Preprint of the Institute of Theoretical and Experimental Physics (ITEP) no. 100, 1987, 24 pp.

V. N. Kolokoltsov. Idempotent analogs of linearly equivalent spaces (in Russian). Proc. Conf. "Optimal Control, Geometry, Analysis", Kemerovo, 1988, p. 30.

S. Yu. Dobrokhotov, V. N. Kolokoltsov and V. P. Maslov. Asymptotical solution of the problem of large deviations for the equation  $hu_t = (h^2\Delta/2 - V(x))u$  and the splitting of the spectrum of the operator  $-h^2\Delta/2 + V(x)$  (in Russian). Proc. Conf. "Differential equations", Sept 1990, Baku, Institute of Mathematics, Azerbaidjan Academy of Science, p. 15.

V. N. Kolokoltsov and O. A. Malafeyev. Turnpikes in conflict control processes of infinite duration (in Russian). Proc. Conf. "Non-smooth and discontinuous problems of control and optimization", Vladivostok, Sept 1991, Minsk State University 1991, p. 58-59.

V. N. Kolokoltsov. Idempotent Analysis and multiplicative asymptotics. Thesis of the dissertation in the fulfillment of the requirements for the title of the full Doctor of Science in Physics and Mathematics (in Russian). Steklov Math. Inst. of the USSR Academy of Science, Moscow, 1993.

V. N. Kolokoltsov. Short Deduction and Mathematical Properties of the Main Equation of the Theory of Continuous Quantum Measurement. Proc. Intern. Colloq.on Group Theoretical Methods in Physics GROUP21, Goslar, Germany, 15-20 July 1996 (Ed. H.D. Doebner et al.), World Scientific, 1997, v. 1, 326-330.

M. Akian, S. Gaubert, V. Kolokoltsov. Solutions of max-plus linear equations and large deviations. Proc. 44th IEEE Conf. on Decision and Control and the ECC 2005, Seville, Spain, December 12-15, 2005, p. 7787-7792, see also <http://arxiv.org/abs/math/0509279>.

H. Al-Talibi, A. Hilbert and V. N. Kolokoltsov. Nelson-type Limit for a Particular Class of Lévy Processes. In 'Quantum Theory', American Institute of Physics Conference Proceedings, v. 1232, Melville, New York 2010, p. 189-193.

V. E. Bening, V. Yu. Korolev and V.N. Kolokoltsov. Power losses of asymptotically efficient tests for distinguishing some fractional stable distributions. Mathematics and Statistics Research Report 27/03, Nottingham Trent University, 2003.

V. E. Bening, V.Yu. Korolev and V.N. Kolokoltsov. Estimation of parameters of fractional stable distributions. II. Mathematics and Statistics Research Report 28/03, Nottingham Trent University, 2003.

Vassili N. Kolokoltsov, Jiajie Li and Wei Yang. Mean Field Games and Nonlinear Markov Processes (2011). [arXiv:1112.3744](https://arxiv.org/abs/1112.3744)

V. N. Kolokoltsov and O. A. Malafeyev. On some models of many agent systems with competition and cooperation (2012). [arXiv:1201.1745](https://arxiv.org/abs/1201.1745)

V. Kolokoltsov and M. Veretennikova. Controlled CTRW and Fractional HJB equations (2012). [http://arxiv.org/abs/1203.6333](https://arxiv.org/abs/1203.6333)

V. Kolokoltsov and W. Yang. Sensitivity analysis for HJB equations with an application to a coupled backward-forward system. [arXiv:1303.6234](https://arxiv.org/abs/1303.6234)

Vassili Kolokoltsov, Hemant Passi, Wei Yang. Inspection and crime prevention: an evolutionary perspective (2013). <http://arxiv.org/abs/1306.4219>

V. Kolokoltsov. Chronological operator-valued Feynman-Kac formulae for generalized fractional evolutions. arXiv:1705.08157

Stamatios Katsikas and Vassili Kolokoltsov. Evolutionary, Mean-Field and Pressure-Resistance Game Modelling of Networks Security. Submitted.

V. Kolokoltsov. The probabilistic point of view on the generalized fractional PDEs. Submitted.

V. Kolokoltsov. Mixed fractional differential equations and generalized operator-valued Mittag-Leffler functions. Submitted.

(e) Publications with my name as a key-word in the title:

D. Yur'ev. *Belavkin-Kolokoltsov watch-dog effect in interactively controlled stochastic computer-graphic dynamical systems*. Theor. Math. Phys. **106:2** (1996), 276-290.

## 6. SUPERVISION OF RESEARCH STUDENTS AND POST-DOCS

Director of studies for PhD:

Graduated:

1. A. Tyukov. "Stochastic Equations of Mathematical Physics driven by Lévy noise" (graduated 2001, Nottingham Trent).

2. Z. Hucki. "Game Theoretic Analysis of Rainbow Options" (graduated 2005, Nottingham Trent).

3. RuiXin Lee. 'Stochastic duality of Markov processes' (start 2009- graduated 2014, Warwick)

4. Tomasz Lapinski. 'Limit theorems leading to Bose-Einstein, Maxwell-Boltzmann Statistics and Zipf-Mandelbrot Law' (start 2009 - graduated 2014, Warwick)

5. Maria Veretennikova 'Controlled Fractional Dynamics' (start 2011 - graduated 2014, Warwick)

6. Elena Hernandez-Hernandez on 'Fractional Dynamics' (2013 - graduated 2016, Warwick, viva Nov., 2016)

7. Alexei Pak on 'Nonlinear SPDEs with coefficients depending on VaR' (2012 - 2017, Warwick, viva March 2017)

8. Dialid Santiago (jointly with S. Assing) on 'Nonlinear Markov processes' (2012 - submitted 2016, graduated 2017, Warwick)

9. Stamatios Katsikas on 'Inspection-Corruption Games' (2013 -2018, viva 12 Jan 2018)

10. Lorenzo Toniazzi on 'Fractional calculus and duality' (2014 -2018, viva Nov 2018 )

Current:

11. Ifan Johnston on 'Markov processes generated by pseudo-differential operators on bounded domains(2016 -)

Second Supervisor for PhD studies of Fuchang Tang (grad. 2000, Nottingham Trent Uni), Larisa Khodarinova (grad. 2002, Nottingham Trent Uni), Haidar Al-Talibi (grad. 2012, Linne Uni Sweden)

I have supervised the MRes dissertation of J. Li on 'Mean-field games' (graduated 2013) and more than 30 MSc research projects, several internships for research students, like to Antoine Mouzard from the University of Rennes in June-July 2016, Alekos Cecchin from Padova (November 2016) and Xiaoyan Su from Sichuan University China in 2016-2017 (supported by the Chinese scholarship council)

I have supervised PostDoc researcher Dr. Wei Yang (2010-2012), later on a lecturer at the Strathclyde University

## 7. GRANTS and AWARDS (since 1996)

St Petersburg University Research Award 2011 for the book 'Understanding Game Theory' (jointly with O. A. Malafeyev).

1998, 1999, 2000 London Math. Society grants for organising Midlands Math. Phys. seminar (joint bid of Nottingham Trent University, the University of Nottingham, and Loughborough University),

1998 Grant from The Alexander von Humboldt foundation for two months research work in Bonn University, Germany,

1998 Nottingham Trent University Research Enhancement Fund Grant for a PhD bursary, (pounds 18000)

1999-2002 Nottingham Consultancies Ltd Commercial Research Funding (pounds 18000) for a joint project (with the Nottingham Business School) on the application of game theory in management (in collaboration with BOOTs Ltd),

2002-2004 Royal Society Grant (pounds 10000) for a two year Joint Project on Probability and Statistics with a Russian group (principal investigator),

2002 London Math. Society grant for an international visitor (principal investigator)

2002-2005 EPSRC case study with BOOTs the Chemist plc (pounds 40000): "The optimization of market share in the retail sector", collaboration with Nottingham Business School

2006 Mexican grant (CIMAT) for a three year collaboration project with the probability group from CIMAT (Centro Investigaciones Matematicas, Mexico, Guanajuato)

2006, 2007 LMS grants (pounds 1200 each) for organizing short workshops on "Interaction and Non-commutativity" (joint venture with the University of Nottingham and Imperial College)

2009-2011 EPSRC grant for organising Symposium 'The Mathematics of Complexity Science and System Biology' (pounds 253000), co-investigator

2009-2012 AFOSR US research grant on 'Nonlinear Markov games' for a 3 year Post-Doc (\$420000), PI

2012 Grant from the Linne University Sweden (5000 pounds) and the University of Warwick WAMP grant (2000 pound) for organizing the workshop 'From mean-field control to weak KAM dynamics' in Warwick 7-10 May 2012

2012 Grant from the Linne University Sweden (3000 pounds) and the University of Warwick WAMP grant (2500 pound) for organizing the 4th Warwick workshop on 'Control Theory and Games' in Warwick 7-10 May 2013

2013 Grant from the Linne University Sweden (3000 pounds) for organizing the 5th Warwick workshop on 'Control Theory and Games' in Warwick 29 Apr - 2 May 2014

Lots of travel grants for visiting conferences and seminars

## 8. ADVISORY WORK

(a) Member of the Advisory Panel of the Journal of Physics A (2011 -2012 )

Member of the Editorial Boards of

The Open Journal of Optimization (OJO, 2012 - ) <http://www.scirp.org/journal/ojop/>

Statistics, Optimization & Information Computing (SOIC, 2013 - ) <http://www.iapress.org/index>

Dynamic Games and Applications (2013 - ) [www.springer.com/mathematics/applications/journal](http://www.springer.com/mathematics/applications/journal)

Asia Pacific Journal of Mathematics (2014 - ) <http://apjm.apacific.org/>

Fractional Differential Calculus (2014 - ) <http://fdc.ele-math.com/editorial>

Issues of Analysis (2013 - ) <http://issuesofanalysis.petrus.ru>

Cogent Mathematics (2016 -2018) <https://www.cogentoa.com/journal/mathematics>

(b) Refereeing: Physics Letters A and Journal of Physics A, The Annals of Applied Probability, The Annals of Probability, Communication of Mathematical Physics, Mathematical Notes, Theoretical Computer Science, Kybernetika, Mathematische Nachrichten, Methodology and Computing in Applied Probability, Discrete Event Dynamic Systems, Optimization, Stochastic Processes and Their Applications, Journal of Theoretical Probability, International Journal of Dynamic Games, Bernoulli, PTRF, SIAM journals, Electronic Journal of Probability, Theory of Probability and Applications, American Mathematical Monthly, Journal of Functional Analysis, IEEE Transactions on Automatic Control, IJGT and many many others

(c) Reviewing books for "Mathematics Today" and London Mathematical Society (for example, "Geometric Asymptotics for Nonlinear PDE I" by V.P. Maslov and G.A.



Omel'yanov (AMS 2001). Bull. London Math. Soc. **35** (2003), 142-144) as well as papers and books for the AMS "MathSciNet"

(d) Evaluating research proposals and results:

Member of the Board of Experts of the Committee for Research Evaluation (CIVR) of the first Italian research evaluation exercise (VTR), 2005,

Evaluation of INdAM Cofund fellowships in Mathematics and/or Applications for Experienced Researchers cofunded by Marie Curie Actions) Website <http://cofund.altamatematica.it/> (Aug -Sep 2011),

External advisor for the selection committee (for Universitätsprofessors Stochastik) of the Bergische Universität Wuppertal, Fachbereich C (Mathematik und Naturwissenschaften), 2010

Evaluating research grant proposals for the Air Force Office of Scientific Research (2010, 2011, 2012)

Evaluating research grant proposals for the Swiss National Science Foundation [www.snf.ch/](http://www.snf.ch/) (SNSF, June 2012)

Evaluating research grant proposals for EPSRC, e. g. September 2012, December 2012, September 2014, April 2015 (EP/N006984/1), March 2017, March 2019, April 2019

Evaluating research grant proposals for the 'Investigador FCT' (Fundação para a Ciencia e a Tecnologia) Portugal Science Foundation (September 2012)

Peer reviewer for The National Agency for the Evaluation of Universities and Research Institutes (ANVUR) assessment of research performed in the time frame 2004-2010 by researchers of all Italian universities and research institutes: eValuation of Quality of Research (VQR 2004-2010) (Autumn 2012).

External advisor for the Promotion Committee for King Abdulaziz University, Saudi Arabia, November 2013

Evaluating research grant proposal "New Kinds of Forward-backward Stochastic Systems with Applications" for the Research Grants Council Hong Kong (April, 2017)

External advisor for the Promotion Committee for the Macau University, China, January 2019

Reviewing book proposals for Cambridge University Press, DeGruyter Publishing Corporation, Birkhauser US, Springer, CRC press and other

(e) External Examiner on research degrees:

"Habilitation a diriger des recherches" (French Second Degree above usual PhD) for L. Truffet, Institut de Recherche en Communications et Cybernetique de Nantes, France, December 2004,

MPhil degree for A. Aminu and Kin Po Tam at Birmingham University 2008;

PhD degree for A. Aminu: "Max-algebraic linear systems and programs". Birmingham University UK, 2009.

PhD degree for I. Papageorgiu at Imperial College 2010.

PhD degree of P. S. Straka "Continuous Time Random Walk Limit Processes". The University of South Wales, Sydney, Australia, 2011.

PhD degree of P. Poncet at École Polytechnique (Palaiseau) and INRIA (Saclay-Ile-de-France), Title: "Infinite-dimensional idempotent analysis. The role of continuous posets". France, November 2011.

PhD degree of F. Mina at Imperial College, Viva Feb. 2015.

PhD degree of Peter Helgesson, Chalmers University of technology and the University of Gothenburg, Sweden, Viva 5th June 2015

PhD degree of M. Victor Rabié, 'A stochastic equation with censored jumps related to multi-scale Piecewise Deterministic Markov Processes', University of Paris-Est, June 2015

PhD degree of Lorick Huang, 'EDS Dirigées par des Processus Stables: Méthode Paramétrix pour des Estimées de Densités et Application aux Algorithmes Stochastiques' Université Paris Diderot (Paris 7), Sorbonne Paris Cité, June 2015

PhD degree of Andrea Di Stefano, 'Random Walks Interacting with Evolving Random Environments and Related Kinetic Equations', University Bielefeld, July 2015

PhD degree of Martin Friesen 'Semigroup methods for spatial birth-and-death processes', University Bielefeld, July 2016

PhD degree of Mr Saul Mendoza Palacios "Evolutionary game theory: a general framework for the replicator dynamics", Centre de Investigación y de Estudios Avanzados del I. P. N. Departamento de Matemáticas, Apartado Postal 14-740 07000 Mexico, D. F., 2016

PhD degree of Frantisek Zak, Imperial College, November 2016

PhD degree of Ms Awaz Muhammad, Leicester Uni., Viva October 2017

Full doctor (Habilitation) degree of E. Shishkina, Voronezh University, Russia, Viva June 2019

Internal Examiner on research degrees: PhD for Martin Brooks (1997) at the Nottingham Trent University, MRes degree for Ashish Kumar at Warwick Statistics (2012), PhD in Mathematics and Complexity Science for Gui P. A. de Mendonca at Warwick (2013), PhD for Amogh Deshpande at Warwick Statistics (viva Dec. 2014), PhD for James Thompson at Warwick Mathematics (viva Dec. 2015), MPhil for Chris Pettitt at Warwick Statistics (viva Dec. 2015) PhD for Seb Armstrong at Warwick (viva May 2018)

(f) External Examiner for Undergraduate and MSci pure and applied Math degrees at Imperial College, 2009 - 2011

## 9. TALKS given at CONFERENCES, since 1996

additional keys: i - invited, c - chair of session

1996 Germany, Goslar, Arnold Sommerfeld Institute - XXI International Colloquium on Group Theoretical Methods in Physics

1997 Cyprus - The IEEE Mediterranean Conference on control and systems (i)

1997 Nottingham University - International Workshop On Idempotency (c)  
(member of organising Committee)

1998 Bristol, Basic Research Institute in Mathematical Science (BRIMS), Hewlett-Packard Labs - Conference on Non-expansive maps (i,c)

1998 Bonn University - Conference on Dirichlet forms and related topics (i)

1998 Nottingham Trent University - International Conference "Probability: Theory and Applications" (i,c)

- 1999 Paris, INRIA and Ecole Normal - Conference on Algèbre tropicales (i)
- 1999 France, Caen University - Conference on Idempotent Mathematics (i,c)
- 1999 Moscow - International Conference on Optimisation, Analysis, Geometry dedicated to the 90-th Anniversary of L.S. Pontryagin (i)
- 1999 Russia, St. Petersburg - International Conference on Optimal Control (i)
- 1999 Edinburgh - International Workshop on Financial Mathematics
- 1999 Nottingham University - "An Asymptotic Day in Nottingham" (i)
- 2000 Nottingham University - Workshop "Quantum Probability and Paradoxes of the Quantum Century" (i)
- 2000 University of Warwick - Conference on Analysis on Loop spaces and Related Topics, Satellite to ICMP 2000 (i)
- 2000 Russia, St. Petersburg - IFAC (International Federation for Automatic Control) Conference on Optimisation (i, member of programme committee)
- 2000 Nottingham - "Non-commutativity, Probability, Geometry" - Satellite to ICMP 2000 (member of local organizing committee, c)
- 2000 Japan, Kyoto University - Intern. Conference on Infinite Dimensional Analysis and Quantum Probability (i)
- 2001 Italy, Trento - Intern. Conference on Quantum Probability (i). Title: "Stochastic Evolutions and Boundary Value Problems"
- 2001 (April) Warwick - Conference on Lévy Processes (i). Title: "Semiclassical Asymptotics for Stable Like Processes"
- 2001 (July) San Diego USA - the fifth SIAM Conference on Control (i,p) (the lecture "Non-expansive maps in financial mathematics" was delivered there on my behalf by a colleague).
- 2001 (August) Prague - Workshop on Max-Plus Algebras, Satellite to the IFAC Symposium on System Structure and Control (i) (the lecture "Small diffusion and fast dying out asymptotics for superprocesses" was delivered there on my behalf by a colleague)
- 2001 (August) Germany, Oberwolfach - Intern. Workshop on Coagulation (i)
- 2001 (August) Serbia, Sokobania and Nish - Conference and Summer School on Mathematical Physics (i). Talks: "Mathematics of the Feynman path integral" and "Quantum filtering equation"
- 2002 (April) UK, Swansea - Conference on Stochastic models in Hydrodynamics (i). Title: "On Measure-Valued Limits of  $k$ -ary Interacting Particles"
- 2002 (May) Bulgaria, Varna - International Seminar on Probability and Statistics (i). Title: "Stable-Like Processes"
- 2002 (May) Russia, Obninsk - International Conference devoted to the memory of the famous Russian mathematician Chebyshev (i). Title: "On the Rigorous Definition of the Feynman Path Integral"

2002 (July) UK, Swansea - Workshop on Lévy type processes (i). Title: "Feller Processes with Decomposable Pseudo-Differential Generators"

2003 (February) Austria, Vienna, Schrödinger International Institute - International Conference "Idempotent Mathematics and Mathematical Physics" (i,c). Title: "Functional Galois Connections and Applications"

2003 (June) Bulgaria, Sozopol - International Summer Conference on Probability and Statistics (i). Title: "Measure-valued limits of interacting particle systems with  $k$ -nary interaction; application to statistical mechanics, population dynamics and evolutionary biology"

2003 (July) Birmingham - International Workshop on Max-Plus algebra (i). Title: "Invertibility of Functional Galois Connections"

2003 (July) IMA Minnesota USA - Probability and Partial Differential Equations in Modern Applied Mathematics (i). Title: "Mathematics of the Feynman Path Integral Applied to the Schrödinger and Stochastic Schrödinger equations"

2003 (December) Cambridge University - : IGSw04 - Stochastic Methods in Coagulation and Fragmentation (i). Title: "Non-binary interacting particle systems and limiting kinetic equations; analytic and probabilistic study"

2005 (May-June) University of Wales, Swansea - EPSRC-LMS School on Stochastic Processes and Applications (i). Title: "Nonlinear Markov Semigroups, Kinetic Equations and Interacting Lévy processes"

2005 (July) Edinburgh University - ICMS Workshop on Coagulation-Fragmentation Processes. Title: "Analytic Approach to Proving the Law of Large Numbers and the Central Limit Theorems for General Coagulation-Fragmentation Models"

2005 (December) 44th IEEE Conf. on Decision and Control and the ECC 2005, Seville, Spain. Talk (jointly with S. Gaubert and M. Akian): "Solutions of the Max-Plus Linear Equations and Large Deviations" (delivered by M. Akian)

2006 (July) Nottingham University - Quantum Probability, Information and Control Symposium (i). Title: "Boundary-value problems and stochastic evolutions"

2007 (April) Gregynog - "Warwick - Wales statistics seminar" (i). Talk: Continuous Time Random Walks

2007 (July) Moscow - International seminar "Matrix Methods and Operator Equations" (i). Talk (jointly with S. Gaubert and M. Akian): "On the connection between the regularity of matrices over idempotent semirings and the solutions to the assignment problem"

2007 (August) Moscow - International Workshop "Idempotent and Tropical Mathematics and Problem of Mathematical Physics" (i). Talk (jointly with S. Gaubert and M. Akian): "On the Assignment Problem for a Countable State Space"

2007 (September) Oberwolfach - Conference 'Coagulation and Fragmentation Models' (i). Talk: "The Central Limit Theorem for the Smoluchovski Coagulation Model"

2009 (January) Warwick - Workshop 'Aggregation, condensation and coagulation in particle systems' (i). Talk: "Dynamic Law of Large Numbers and Central Limit Theorem with the estimates of error terms for Smoluchovski's coagulation and Boltzmann collisions"

2009 (March) Arlington VA USA - Conference 'Adversarial and Stochastic Elements in Autonomous Control' organised by AFOSR (i). Talk: Nonlinear Markov games

2009 (July) Imperial College London - 7 th ISAAC Congress (i). Talk: "SDEs driven by nonlinear Lévy noise"

2010 (18-19 January) Swansea University - Feynman Path Integrals and Their Applications. Talk: "Feynman Path Integral via Jump- type Markov Processes"

2010 (11-13 April) Warwick - Dynamics in Games and Economics workshop (i). Talk: "General flows of deterministic and stochastic replicator dynamics"

2010 (14-17 April) Warwick - Game theory for finances, social and biological sciences (EPSRC Workshop). Talk (jointly with Wei Jung): "Turnpikes for stochastic games and nonlinear Markov games".

2010 (May 20-21) Sweden, Växjö (Linnaeus University) - Stochastic Analysis and Applications. Talk: "Nonlinear Markov processes and games via SDEs driven by nonlinear Levy noise."

2010 (June 21-25) Pisa, Italy - 16th Conference of the International Linear Algebra Society (i). Talk: "Nonlinear Markov games"

2010 (July 5-9) Budapest - 19 th International Symposium on Mathematical Theory of Networks and Systems (i,c). Two talks: "Nonlinear Markov games" and "Stochastic Perturbations of Deterministic Optimization Problems with Applications to a Spin Control Problem (Control of a Two-Level Atom)".

2010 (Aug 5 - 8) Kiev - Humboldt Kolleg 'Mathematics and life sciences: possibilities, interlacements and limits' (i). Talk: " Markov processes via SDEs driven by nonlinear Levy noise."

2010 (Aug 9 - 13) Arlington VA USA 'Dynamics and control program review' (i). Talk: Nonlinear Markov games.

2011 (March 16-18) St. Luis Potosi, Mexico - International conference on stochastic control dedicated to the 65 birthday of Onésimo Hernandez-Lerma (i). Talk "Rainbow options via the interval model of stock prices: risk-neutral selections, explicit formulas, algorithms".

2011 (June 14-16) Arlington VA - AFOSR Review meeting for the Dynamics and Control Program (i). Talk "Nonlinear Markov control processes and games".

2011 (June 17) Swansea - Fractional calculus and random processes (i). Talk "The limits of position dependent CTRW (continuous time random walks) with applications to option pricing".

2011 (June 27-28) Växjö, Sweden - Stochastic Analysis and Applications, 2nd Linnaeus University Workshop (i). Joint talk with Wei Yung (delivered by W.Y.) "Nonlinear Markov processes".

2011 (July 6 - 8) the Royal Institute of Technology (KTH) in Stockholm, Sweden - The 16th INFORMS Applied Probability Conference (i). Joint talk with Wei Yung (delivered by W.Y.) "Nonlinear controlled Markov processes".

2011 (July 25 - 27) Baltimore Maryland USA – SIAM conference on Control and its Applications, member of the organizing committee. Talk: "Recent developments in Nonlinear Markov control processes"

2011 (August 22 - 27) Moscow – 8th ISAAC Congress 2011 (i). Talk: “Nonlinear Markov processes and interacting particles”.

2011 (September 12-16) Vienna – ECCS’11 (European Conference on Complex Systems), co-organiser (together with M. Kirkilionis and J. Hofbauer) of the Satellite workshop “Recent Trends in Game Theory”. Joint talk with Wei Yang: “Nonlinear Markov Control Processes and Games”.

2011 (November 30- December 2) Warwick – Topics in Control (i,c). Talk: ”Game-Theoretic analysis of incomplete markets” and joint talk with W. Yang and J. Li “Mean field games and nonlinear Markov processes”.

2012 (22-23 May) Linnaeus University Växjö Sweden – Guest Lecture Course ‘Introduction to nonlinear Markov processes’ and (24 - 25 May) Stochastic Analysis and Applications workshop (i). Talk: “Nonlinear Markov battles”.

2012 (18-22 June) Bielefeld University International Workshop ‘Qualitative Behavior of Stochastic Systems and Applications’ (i). Talk: “Nonlinear Markov processes”.

2012 (18-22 July) Bysice, Czech Republic - XV International Symposium on Dynamic Games and Applications (c). Talks: “Mean field games and nonlinear Markov processes” (jointly with Wei Yang) and “Game-theoretic analysis of rainbow options in incomplete markets”

2012 (6-9 Aug) Arlington VA –Control and Dynamics Program Review (i). Talk “Nonlinear Markov battles”

2012 (27-31 Aug) Moscow, Independent University – Tropical mathematics 2012 (i). Talk “On Maslov’s quantization of thermodynamics”

2012 (24 -28 Sep) Svetlogorsk (Kaliningrad Region) – The XXX International Seminar on Stability Problems for Stochastic Model (i). Talk: ‘Nonlinear Markov processes and Mean-Field Games’ and Invited lecture: ‘Lévy Processes and SDE driven by Lévy and Poisson noises’

2012 (24 -25 Nov) 2nd Annual Manchester workshop ‘Stochastic Economics and Finance’ (i). Talk “Game theoretic analysis of incomplete markets”

2013 (25 -27 March) Liverpool. Workshop ‘Controlled Stochastic Processes: Theory and Applications’ (i). Talk: “Nonlinear Markov Battles”

2013 (8 -12 April) Rennes. ‘Perspectives in Analysis and Probability. Opening conference’ (i). Talk: “Duality of Markov processes: a study via semigroups and generators”

2013 (10-14 June) Bielefeld. Closing conference ‘Fusion of knowledge in stochastic modelling of large complex systems’ (i). Talk: “Stochastic differential equations depending on VAR and other quantiles”

2013 (1-4 July) Rome, EuroInforms, 26th European Conference on OR (i). Talk: “Nonlinear Markov games on a finite state space (mean-field and binary interactions)”, and Joint talk (delivered by W. Yang): “Inspection Games”

2013 (8 -11 July) San Diego USA – SIAM conference on Control and its Applications, organizer of a session and Talk: “Stochastic Games Against Nature: Applications to Finance”

2013 (4 - 6 Sep.) Padova - Mean Field Games and Related Topics - 2 (i). Talk: “On the  $1/N$  convergence rates for mean-field approximations”

2013 ( 9 - 13 Sep) Warwick -EPSRC Statistical Mechanics Symposium. Opening Work-

shop 'Models from Statistical Mechanics in Applied Sciences' (i). Talk: "Bose-Einstein condensation in number theory and economics"

2013 (18 Nov) Warwick - Hybrid Control of Complex Systems (MIR@Warwick day) (i). Talk: Controlled CTRW, random switching and fractional calculus.

2014 (3 - 4 March) University of Strathclyde, Glasgow. Game Theory and Computational Complexity (i,c). Talk: Mean-field games with major player and/or common noise. <http://icms.org.uk/workshops/NAISGame>

2014 (19 - 22 May) at ZIF, Bielefeld: "Complex systems and interacting particles" (in honor of Yu. Kondratiev 60th birthday) (i). Talk: Duality for Markov processes.

2014 (10-13 June) Linnaeus University Växjö Sweden. 5th conference 'Stochastic Analysis and Applications workshop' (i,c). Talk: SDEs and SPDEs with coefficients depending on VaR.

2014 (27 June - 4 July) International Conference on Mathematical Modeling at Yakutsk University (i) Plenary Talk: Mean-field games and applications, and a short course for students: Introduction to Financial Mathematics

2014 (9-12 July) 16th ISDG Symposium, Amsterdam, the Netherlands. Not present, but two joint talks delivered by co-authors: 'Mean Field Approximation of Controlled Nonlinear Markov Processes with Jumps and Arbitrary Set of Agent's Classes' with Troeva and Wei Yang, and 'Mean field Game Approach to Inspection Game' with Wei Yang

2014 (15 - 19 Sep) UK Easter Probability Meeting, Imperial College London (i). Talk: Duality of Markov processes

2014 (16 October) Conference 'Analyse et Probabilités', Université d'Evry (i) Laboratoire de Mathématiques et Modélisation d'Evry (LaMME) Université d'Evry (i). Talk: Fractional Hamilton-Jacobi-Bellman equation.

2014 (10-14 November) School and Conference in BCAM (Basque Center for Applied Mathematics), Bilbao, Basque Country - Spain 6 hours invited mini-course on Fractional calculus and CTRW (i).

2015 (11 Feb) Mathematics Colloquium, University of Birmingham (i). Talk: Evolutionary game-theoretic modelling of cyber-security, crime prevention, inspection and corruption.

2015 Semester Program 'Geometric Mechanics, Variational and Stochastic Methods' 01.01.15 - 30.06.15 at the Centre Interfacultaire Bernoulli (CIB) - EPFL, Switzerland (i). My talk (20.02.15) 'Generalized mass action law and thermodynamics of nonlinear Markov processes'

2015 (2 - 6 March) 'New Perspectives in Analysis and Probability', Dep. Maths, University of Sussex (i). Talk: Probabilistic methods for solving fractional differential equations.

2015 (10-12 June) 'Mean-Field Games and Related Topics - 3', Paris, Institute Henry Poincaré (i). Talk 'On mean-field games with common noise' was presented on my behalf by P. Caines (as I was unable to attend).

2015 (29 Jun - 04 Jul) 'Modern trends in controlled stochastic processes: theory and applications', Liverpool. (i). Talk: Games of Pressure and resistance.

2015 (8 - 10 July) SIAM Control Conference, Paris (i). Two talks presented by myself and two talks on joint research presented by my co-authors.

2015 (16-17 July) ISDG2015, University of Strathclyde, Glasgow (i). Talk: Mean-field game model of corruption.

2015 (16-18 Dec) 'Stochastic Limit Analysis for Reacting Particle Systems (SLARPS)', Weierstrasse Inst. Berlin (i). Mini lecture course (three two-hour lectures): Dynamic law of large numbers and CLT, with the rates of convergence, for interacting particle systems including Smoluchovskii coagulation and Boltzmann collisions.

2016 (17.05-20.05) Workshop 'Fractality and Fractionality' at the Lorentz Center Leiden (i,c), The Netherlands. Talk: Probabilistic Approach to the Analysis of Fractional Caputo derivatives.

2016 (2-3 June) Workshop "Probability, Non-Local Operators and Applications" at the Department of Mathematics, University of Sussex (i). Talk: Fractional equations with two-sided Caputo derivatives.

2016 (12-15 July) 17th International Symposium on Dynamic Games and Applications, Urbino, Italy. There were 4 talks with me as a coauthor.

2016 (17-21 October) A Workshop on Future Directions in Fractional Calculus Research and Applications (Michigan State University) (i) A talk on our joint results was given by my PhD student L. Toniazzi: On a Probabilistic Generalization of Fractional Derivatives.

2017 (4-9 June) NSF/CBMS Conference in the Mathematical Sciences (Supported by NSF): Nonlocal Dynamics: Theory, Computation and Applications, Chicago, USA (i) (talk on our joint results presented by my PhD student L. Toniazzi).

2017 (13-15th July) The 11th workshop of the International Society of Dynamic Games (ISDG). Banach Center, Institute of Mathematics, Polish Academy of Sciences, Warsaw (two talks presented by my co-authors on our joint research)

2017 (28-30 June) Eleventh International Conference on Game Theory and Management (GTM 2017) (i). Saint Petersburg University (in collaboration with the International Society of Dynamic Games) Talk: Evolutionary and mean-field game modelling of cyber-security, inspection and corruption, counter terrorist measures, coalition building and network growth.

2017 (4-8 July) Yakutsk University, Russia (July) - 8th International Conference on Mathematical Modeling (ICMM - 2017), (i). Two talks given: plenary and a sectional

2017 (10-20 July) Durham Symposium on Stochastic Analysis (i). Talk: Mean-field games with common noise and nonlinear SPDEs.

2017 (Aug 28 Sep 1) Institute for Pure and Applied Mathematics (IPAM), UCLA campus, USA – Workshop "Mean Field Games (i) <http://www.ipam.ucla.edu/mfg2017> (Talk on my behalf presented by my PhD student Stam. Katsikas)

2017 (December) Moscow (Snegiri) LSA conference (i). Talk: Generalized Mittag-Leffler functions.

2018 (12-14 Feb) Mean-field games, energy and environment. Alan Turing Institute, London, (i). Talk: Turnpike theory for mean-field games.

2018 (26-28 March) (travel 25-28) Bielefeld-Edinburg Stochastic Spring (i). Talk: Recent Advances in analytic and probabilistic methods for solving fractional PDEs.

2018 (8-19 April) Torino International Master course 16 hours on Stochastic Analysis and a talk on the research seminar: Recent Advances in analytic and probabilistic methods



for solving fractional PDEs.

2018 (23 - 29 April) International Workshop 'Functional Inequalities and SPDEs I, Banach Center, Warsaw, (i). Joint talk (on two sides estimates for fractional heat kernels) delivered by my PhD student Ifan Johnston.

2018 (28th May - 1st June 2018) (travel 26-2) Summer school and conference on nonlocal operators, Bilbao. Minicourse (3 lectures): Probabilistic methods for solving fractional PDEs.

2018 (4 - 6 June) (travel 3-5) International Workshop 'Functional Inequalities and SPDEs II, Banach Center, Warsaw, (i). Talk: Sensitivity and regularity for the solutions to the McKean-Vlasov-type PDEs and SPDEs, with possibly singular coefficients, and applications.

2018 (11 - 25 June) Visit Wuhan, Huazhong University of Science and Technology (HUST), and Beijing Academy of Sciences, minicourse for students (fractional calculus and nonlinear Markov processes), several seminar talks (Wuhan University, Wuhan University of Economics, China Academy of Sciences)

2018 (3-6 July) 14th Viennese Conference on Optimal Control and Dynamic Games, VC2018, Vienna, Austria. Joint talk Kolokoltsov V.N. and Troeva M.S. (delivered by M.S. Troeva) McKean-Vlasov SPDEs for Mean Field Games based on Stable-Like Processes with Common Noise.

2018 (9-12 July) 18th International Symposium on Dynamic Games and Applications, ISDG-2018, Grenoble, France. Joint talk Vassili N. Kolokoltsov and Marianna Troeva (delivered by M.S. Troeva) On Mean Field Games with Common Noise based on Stable-Like Processes.

2018 (24-28 Sep) Perm International Seminar on Stochastic analysis (i). Talk: probabilistic methods in the theory of fractional PDEs.

2018 (6-9 November) Conference in PDE and applications in memory of B. Sternin, Moscow (i). Talk: Fractional calculus. <http://www.google.com/url?q=http>

2018 (3-7 December) Moscow (Snegiri) LSA conference (i). Talk: Generalized Mittag-Leffler functions as the tools for solving fractional PDEs.

2019 (11-15 March) Marseille CIRM Luminy, France. Conference: Perturbation Techniques in Stochastic Analysis and its Applications (i). Talk: probabilistic methods in the theory of fractional PDEs.

## 10. CONFERENCE ORGANIZATION

1997 Nottingham University - International Workshop On Idempotency: member of organizing committee,

2000 Russia, St. Petersburg - IFAC (International Federation for Automatic Control) Conference on Optimization: member of international programme committee

2000 Nottingham - "Non-commutativity, Probability, Geometry" - Satellite to ICMP 2000: member of local organizing committee

2001 Prague, Workshop on Max-Plus Algebras. Satellite to the IFAC Symposium on System Structure and Control: member of international programme committee

2008 Warwick (31 March-4 April) - International Workshop 'Probability 2008: New scaling limits and other recent developments': member of organizing committee

2008 Warwick (18-19 September) International 'Fractional Flow Workshop' (main organiser)

2009 Warwick (20-25 September) European Conference on Complex Systems (ECCS'09) (member of local organising committee)

2010 Warwick (14-17 April) Game Theory Workshop in the framework of 2009/2010 EPSRC Symposium on the Mathematics of Complexity Science and System Biology (main organiser)

2010 Budapest (5-9 July) MTNS2010, organiser of a special session "Control of Markov and Nonlinear Markov processes"

2011 Baltimore Maryland USA (July 2011) SIAM conference on Control and its Applications, member of the organizing committee and co-organiser (jointly with B. McEneaney and O. Hernandez-Lerma) of special sessions on "Game theory" and "stochastic control"

2011 Vienna (September 12-16) ECCS'11 (European Conference on Complex Systems), co-organiser (together with M. Kirkilionis and J. Hofbauer) of the Satellite workshop "Trends in Game Theory"

2012 Warwick (7-10 May 2012) School - Conference 'From mean-field control to weak KAM dynamics' (Organizers: Astrid Hilbert, Vassili Kolokoltsov and Sebastian van Strien)

2013 Warwick (7-10 May 2013) School - Conference 'Control Theory and Games' (Organizers: Astrid Hilbert, Vassili Kolokoltsov and Robert MacKay)

2013 San Diego USA (8 -11 July) – SIAM conference on Control and its Applications, co-organiser (jointly with B. McEneaney and O. Hernandez-Lerma) of a special session MS48 "Stochastic Dynamic Games"

2014 Warwick (29 Apr - 2 May 2014) 5th Warwick School - Conference 'Control Theory and Games' (Organizers: Astrid Hilbert, Vassili Kolokoltsov and Robert MacKay)

2014 Yakutsk University, Russia (27 June - 4 July) - 7th International Conference on Mathematical Modeling (ICMM - 2014) (member of the program committee)

2017 Yakutsk University, Russia (July) - 8th International Conference on Mathematical Modeling (ICMM - 2017) (member of the program committee)

## 11. WEB PAGE

Some publications of mine and related information can be found on my home page <http://www2.warwick.ac.uk/fac/sci/statistics/staff/academic/kolokoltsov/>