

MARK KELBERT

Contact details

Office Address: Department of Mathematics, Swansea University, Singleton Park, Swansea SA2 8PP, Wales, UK
Phone (office): +44-1792-295852
Fax: +44-1792-295843
Contact E-mail: m.kelbert@swansea.ac.uk

Personal

Home Address: 50 Bay Tree Avenue, Sketty Park, Swansea SA2 8JW, Wales, UK
Phone (home): +44-1792-424594
Gender: Male
Citizenship: United Kingdom
Date of Birth: 20 November 1950
Marital Status: Married

Research Interests

Probability theory, random processes and fields, mathematical statistics, information theory, mathematical physics, partial differential equations, actuarial mathematics.

Education

1981 PhD in Probability Theory and Mathematical Statistics, Kiev Institute of Mathematics, Ukraine "Stochastic Processes in Complex Communication Networks"; scientific supervisor Roland Dobrushin
1974 Master in Mathematics, Moscow State University, USSR (specializing in Statistics, Probability, Random Processes)

Experience & Employment

2004 - current Reader at Swansea University, Wales, UK
Department of Mathematics
1998 - 2004 Reader at Swansea University, Wales, UK
European Business Management School, Statistics Research Group
1993 - 1998 Lecturer at Swansea University, Wales, UK
European Business Management School, Statistics Research Group
1993 - current Honorary Senior Research Fellow at International Institute of Earthquake Prediction Theory and Mathematical Geophysics RAS, Russian Federation
1990 - 1992 Senior Research Fellow at International Institute of Earthquake Prediction Theory and Mathematical Geophysics RAS, USSR
1976 - 1989 Research Fellow at Acoustic Institute RAS, USSR

Publications

Throughout my scientific career I published eight books, at least 95 papers in peer reviewed journals, more than 40 conference contributions, book reviews, etc. Here I cite a few books and papers that can be considered a representative selection.

1. Kelbert M., Sazonov I., *Pulses and Other Wave Processes in Fluids*. Dordrecht-Boston-London: Kluwer, 1996, 226p. Russian edition: Nauka, 1991
2. Kelbert M., Suhov Y., *Probability and Statistics by Example. Volume I. Basic Probability and Statistics*. Cambridge University Press, 2005, 382p., 2nd edition 2011.
3. Kelbert M., Suhov Y., *Probability and Statistics by Example. Volume II. Markov chains: a primer in random processes and their applications*. Cambridge University Press, 2008, 487p.
4. Kelbert M., Suhov Y., *Information Theory and Coding by Example*. Cambridge University Press, 2013, 526p.
5. Kelbert M., Suhov Y., Mathematical problems in the queueing networks theory, *Journal of Soviet Mathematics*, V.50, N.3, 1988, 1527-1600
6. Dobrushin R.L., Kelbert M., Local additive functionals on Gaussian random fields. *Theory Prob. Appl.*, V. 28, 1983, N.1, 32-44
7. Dobrushin R.L., Kelbert M., Stationary local additive functionals on Gaussian random fields. *Theory Prob. Appl.*, V.28, 1983, N.3, 489-503
8. Kelbert M., Kontsevich M.L., Rybko A.N., On Jackson's networks on denumerable graphs. *Theory Prob. Appl.*, V.33, 1988, N.2, 379-382
9. Karpelevich F.I., Kelbert M., Suhov Yu.M., Higher-order Lindley equations. *Stochastic Processes and their Applications*, V. 53, 1994, N. 1, 65-96
10. Kelbert M., Suhov Y., The Markov branching random walk and systems of reaction-diffusion (Kolmogorov - Petrovskii - Piskunov) equations. *Communications of Mathematical Physics*, V. 167, 1995, 607-634
11. Grigor'yan A., Kelbert M., Range of fluctuation of Brownian motion on a complete Riemannian manifold, *Annals Probab.*, 26, 1998, 1, 78-111
12. Grigor'yan A., Kelbert M., On Hardy-Littlewood type inequality for Brownian motion on Riemannian manifold, *Journ.London Math.Soc.*, (2) 62, 2000, 625-639
13. Grigor'yan A., Kelbert M., Asymptotic separation for independent trajectories of Markov processes, *Probability Theory Related Fields*, V.119, 2001, N.1, 31-69
14. Kelbert M., Rachev S., Suhov Yu., Markov-splitted random fields on a tree, with applications. *Analytical Methods in Applied Probability*, Amer. Maths. Society Translations, Ser.2, V.207, 2002, 115-131
15. Grigor'yan A., Kelbert M., Recurrence and transience of branching diffusion processes on Riemannian manifolds, *Annals Probab.*, 31, 2003, 1, 244-284
16. Kelbert M., Leonenko N., Ruiz-Medina M.D. Fractional random fields associated with stochastic fractional heat equation. *Advances in Appl. Probab.*, V.37, 2005, N.1, 108-133
17. Kelbert M., Sazonov I., Wright A.G., Exact expression for the variance in the photon emission in scintillation counters, *Nuclear Instruments and Methods in Physics Research A*, V.564, 2006, N.1, 185-189
18. Kelbert M., Manopoulou I., Sazonov I., Suhov Yu., Large deviations for a model of excess of loss re-insurance. *Markov Processes Related Fields*, V.13, 2007, N.1, 137-158
19. Kelbert M., Suhov Yu., Branching diffusion on \mathbf{H}^d with variable fission: the Hausdorff dimension of the limiting set. *Probab.Theory Appl.*, 51,1 2006. 241-255. Reprinted in SIAM: V.51, 2007, N.1, 155-167

20. Sazonov I., Kelbert M., Wright A.G., Improved approximation for the variance in the photon emission in scintillation counters, *Nuclear Instruments and Methods in Physics Research A*, V.572, 2007, N. 2, 804-807
21. Kelbert M., Suhov Y., Large-time behaviour of a branching diffusion on a hyperbolic space, *Theory Probab. Appl.*, V.52, 2007, N.4, 660-684. Reprinted in SIAM: V.52, 2008, N.4, 594-613
22. Kelbert M., Suhov Y., Continuity of mutual entropy in the large signal-to-noise ratio limit. *Stochastic Analysis 2010*, Berlin: Springer, 2010, 281-299
23. Sazonov I., Kelbert M., Gravenor M.B., Travelling waves in a lattice of SIR nodes in approximation of small coupling, *Mathematical Medicine and Biology*, V.28, 2011, N.2, 165-183
24. Sazonov I., Kelbert M., Gravenor M.B., A two-stage model for the SIR outbreak: accounting for the discrete nature of the epidemic at the contamination stage, *Mathematical Bioscience*. V.234, N.2, 2011, 108-117
25. Kelbert M., Sazonov I., Gravenor M.B., Critical reaction time during a disease outbreak, *Ecological complexity*, V.8, 2011, N.4, 326-335
26. Kelbert M., Sazonov I., Avram F., Uniform asymptotics of ruin probabilities for Lévy processes, *Markov Processes Related Fields*, V.18, 2012, N.4, 681-692
27. Kelbert M., Suhov Y., Yambartsev A., A Mermin-Wagner theorem for Gibbs state on Lorenzian triangulations, *Journ. Statist. Phys.*, V. 150, 2013, N.4, 671-677
ArXiv:1210.7981v1
28. Kelbert M., Suhov Y., A Mermin-Wagner theorem for quantum rotators on 2D graphs, I. *Journ. of Mathematical Physics*, V. 54, 2013, N.3
ArXiv:1206.1229v2

Grant Participation

Research grants:

1. FAPESP Visiting Professorship at University Sao Paulo, Brazil, 6 months, 2013
2. FAPESP Visiting Professorship at University Sao Paulo, Brazil, 6 months, 2012
3. Isaac Newton Institute Visiting Fellowship, 6 months, 2010
4. EPSRC grant on "Topics in stochastic analysis: branching diffusion, reaction-diffusion equations, epidemiology, scintillation counters and insurance", 2008–2009. PI: M. Kelbert
5. British Academy grant on "Life-health-property insurance and re-insurance and stability of pension funds", 2008–2009. PI: M. Kelbert
6. Research Fellow in Statistics and Operational Research of Welsh Institute of Mathematics and Computations (WIMCS), 2007–2010
7. Isaac Newton Institute Visiting Fellowship, 2 months, 2007
8. EPSRC Visiting Fellowship at Imperial College, 1999–2001. In collaboration with A. Grigor'yan.
9. LMS collaborative grant on "Branching diffusions on manifolds", 1998. In collaboration with A. Grigor'yan.
10. LMS collaborative grant on "Diffusions processes on manifolds", 1997. In collaboration with A. Grigor'yan.

Educational grants:

1. Grant of the Russian Foundation of Basic Research "For translation into Russian and publication of the book *Information Theory and Coding by Example*", 2011.
2. Grant of the Russian Foundation of Basic Research "For translation into Russian and publication of the book *Probability and Statistics by Example, Volume II*", 2008.
3. Grant of the Russian Foundation of Basic Research "For translation into Russian and publication of the book *Probability and Statistics by Example, Volume I*", 2006.
4. Socrates Visiting Grant to support my lecture course at University Roma I, "La Sapienza", Italy, 1997.

Teaching Experience

In the years 1993 – present I taught the following courses at Swansea University, UK: *Stochastic Models, Actuarial Statistics, Partial Differential Equations, Introduction into Life Insurance, Actuarial Mathematics, Life Insurance and Pension Mathematics*, and *Advanced Topics in Probability* at University Roma I "La Sapienza", Italy.

In the years 2005 – present I published a series of books based on undergraduate and postgraduate courses at Cambridge University in *Probability I, Probability II, Mathematical Statistics, Markov Chains*, and (in press) *Information Theory and Coding by Example*. Widely applicable and used worldwide in colleges and universities as textbooks, these books also contain a research component. A review from The Royal Statistical Society prized them as "masterful accounts of Markov random processes". The edition of Volume II, as well as the second printing of Volume I, are already sold out. The second extended edition of Volume I will be published by CUP this year.

Over the years, I supervised over twenty masters students in Swansea University, mostly in financial and actuarial mathematics. I also supervised a number of masters student projects in statistics at

Cambridge University Statistical Laboratory. All of these students have successfully completed their programs, and proceeded to PhD programs or careers in business.

Invited Talks & Visits

Throughout my scientific career, I gave over a hundred invited talks, both in conferences and by personal invitation, in different universities. Below is a list of talks/visits from 2007 to present.

1. Imperial College, London 01/18/07
2. University of York 02/21/07
3. University of Manchester 06/22/07
4. Isaac Newton Institute, Cambridge Program: Analysis on Graphs and Manifolds 06/06/07-09/29/07; Talk 06/07/07
5. Hamilton Institute, Maynooth (Ireland) Workshop in Applied Probability 06/11/07-06/12/07; Talk 06/11/07
6. Oregon State University 09/06/07
7. Stony Brook University 09/11/07
8. University of Maryland 09/13/07
9. University of Pennsylvania, Philadelphia 09/18/07
10. Boston University 09/20/07
11. Northeastern University 09/21/07
12. Cornell University 09/24/07
13. University of Roma 'La Sapienza' 01/10/08
14. University of Pau, France 03/13/08-04/11/08; Talk 03/25/08
15. University of Toulouse, France 04/08/08
16. Institute for Problems of Information Transmission, Russian Academy 08/19/08
17. Leicester University 10/23/08
18. Loughborough University 03/04/09
19. University of Roma 'La Sapienza' 04/30/09
20. Kings College, London 05/08/09
21. Institute for problems of Information Transmission, Russian Academy 08/25/09
22. Congress of the International Society of Analysis, its Applications and Computations, Imperial College, London; Talk 07/15/09
23. Aberystwyth University 09/10/09
24. Cardiff University 10/07/09
25. Liverpool University 10/14/09
26. University of Maryland 11/11/09
27. Courant Institute 11/13/09

28. Yale University (Mathematics) 11/16/09
29. Brown University 11/17/09
30. Yale University (Statistics) 11/18/09
31. Northeastern University 11/20/09
32. Stony Brook University 11/23/09
33. Oregon State University 11/30/09
34. University of Oregon (Eugene) 12/04/09
35. Bristol University 15/02/10
36. Isaac Newton Institute, Cambridge, Program: Stochastic Processes in Communication Sciences
11/01/10–02/07/10
37. International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian
Academy 05/09/10
38. University of Aveiro, Portugal 13/10/10
39. Cambridge University 26/01/11
40. International Institute of Earthquake Prediction Theory and Mathematical Geophysics, Russian
Academy 14/07/11
41. Cardiff University 19/10/11
42. University Sao Paulo, Brazil 22/05/12
43. Institute for Problems of Information Transmission, Russian Academy 06/08/12
44. Cardiff University 30/01/13
45. Kings College London 25/04/13
46. Cardiff University 10/05/13
47. Cardiff University 23/06/14