

Curriculum Vitae of Alexey Kuznetsov

Personal

Address Department of Mathematics and Statistics
York University, 4700 Keele Street
Toronto, Ontario, M3J 1P3, Canada

Office N518, Ross Building

E-mail akuznets@yorku.ca

Webpage <https://kuznetsov.mathstats.yorku.ca/>

Citizenship Canada, Russia

Languages English, Russian

Education

2002-2004 Ph.D. in Mathematics, University of Toronto, Canada
Ph.D. Thesis: “Solvable Markov processes”
Advisor: Prof. C. Albanese

1997-2002 M.Sc. in Mathematics, Diploma with Honor, Moscow State University, Russia
M.Sc. Thesis: “Pricing of bonds in the Ho-Lee model under transaction costs”
Advisor: Prof. A.V. Melnikov

Research Interests

Stochastic processes

Special Functions, Complex Analysis, Numerical Methods

Mathematical Finance, Actuarial Mathematics

Employment

2018-present Professor, Department of Mathematics and Statistics, York University

2011-2018 Associate Professor, Department of Mathematics and Statistics, York University

2008-2011 Assistant Professor, Department of Mathematics and Statistics, York University

2006-2008 Assistant Professor, Department of Mathematical Sciences, University of New Brunswick

2004-2006 Postdoctoral Fellow, Department of Mathematics and Statistics, McMaster University

Grants and Awards

2019	NSERC Discovery Grant: "Lévy processes and their applications" \$25,000 per year for 2019-2024
2017	Casualty Actuarial Society grant "An efficient algorithm for approximating independent and dependent sums of log-normally distributed losses", \$18,000 USD, joint with Ed Furman and Dan Hackmann
2013	NSERC Discovery Grant: "Exit problems for Lévy processes" \$19,000 per year for 2013-2018
2012	NSERC Discovery Grant: "Exit problems for Lévy processes" \$12,000 for 2012-2013
2010	Minor Research Fund, York University, \$1,352
2010	Junior Faculty Research Fund, York University, \$573.97
2007	NSERC Discovery Grant: "Solvable models in option pricing and credit risk" \$12,000 per year for 2007-2012
2004	NSERC Postgraduate Scholarship
2003-2004	Ontario Graduate Scholarship, \$15,000

Published and accepted papers

- [52] A. Kuznetsov and J. Miles "On the rate of convergence of the Gaver-Stehfest algorithm", to appear in the IMA Journal of Numerical Analysis
- [51] J. Miles, E. Furman and A. Kuznetsov "Risk aggregation: A general approach via the class of Generalized Gamma Convolutions", to appear in Variance
- [50] D. Karp and A. Kuznetsov (2021) "A new identity for the sum of products of the generalized hypergeometric functions", Proceedings of the American Mathematical Society, 149, 2861-2870
- [49] E. Furman, D. Hackmann and A. Kuznetsov (2020) "On log-normal convolutions: An analytical-numerical method with applications to economic capital determination" Insurance: Mathematics and Economics, 90, 120-134
- [48] A. Kuznetsov (2020) "On free regular and Bondesson convolution semi-groups", Journal of Theoretical Probability, 33, 1493-1505
- [47] R. Feng, A. Kuznetsov and F. Yang (2019) "Exponential functionals of Lévy processes and variable annuity guaranteed benefits" Stoch. Proc. Appl., 129(2): 604-625
- [46] A. Kuznetsov and M. Kwasnicki (2019) "Minimal Hermite-type eigenbasis of the discrete Fourier transform" J. Fourier Anal. Appl., 25(3), 1053-1079
- [45] A. Kuznetsov (2018) "Using q -calculus to study LDL^T factorization of a certain Vandermonde matrix" Operators and Matrices, 12(3), 773-777

- [44] A. Kuznetsov and M. Kwasnicki (2018) “*Spectral analysis of stable processes on the positive half-line*” *Electron. J. Probab.*, 23, no 10, 1-29
- [43] E. Furman, A. Kuznetsov and R. Zitikis (2018) “*Weighted risk capital allocations in the presence of systematic risk*” *Insurance: Mathematics and Economics*, 79, 75-81
- [42] A. Kuznetsov (2018) “*A direct evaluation of an integral of Ismail and Valent*” ”*Frontiers in Orthogonal Polynomials and q-Series*”, edited by M. Zuhair Nashed and Xin Li, World Scientific Publisher, 417-425
- [41] A. Kuznetsov (2017) “*On Dirichlet series and functional equations*” *Journal of Number Theory*, 180, 498-511.
- [40] A. Kuznetsov (2017) “*Constructing measures with identical moments*” *Proc. Amer. Math. Soc.*, 145, 4431-4441
- [39] B. Dyda, A. Kuznetsov and M. Kwasnicki (2017) “*Eigenvalues of the fractional Laplace operator in the unit ball*”, *Journal of the London Mathematical Society*, 95, 500-518
- [38] B. Dyda, A. Kuznetsov and M. Kwasnicki (2017) “*Fractional Laplace operator and Meijer G-function*”, *Constructive Approximation*, 45(3), 427-448
- [37] R.v.d. Hofstad, M. Holmes, A. Kuznetsov and W. Ruszel (2016) “*Strongly reinforced Polya urns with graph-based competition*”, *Ann. Appl. Probab.*, 26(4), 2494-2539
- [36] E. Furman, A. Kuznetsov, J. Su and R. Zitikis (2016) “*Tail dependence of the Gaussian copula revisited*”, *Insurance: Mathematics and Economics*, 69, 97-103
- [35] R. Feng, A. Kuznetsov and F. Yang (2016) “*A short proof of duality relations for hypergeometric functions*”, *J. Math. Anal. Appl.*, 443(1), 116-122
- [34] D. Hackmann and A. Kuznetsov (2016) “*Approximating Levy processes with completely monotone jumps*”, *Ann. Appl. Probab.*, 26(1), 328-359
- [33] A. Kuznetsov (2015) “*Explicit Hermite-type eigenvectors of the discrete Fourier transform*”, *SIAM J. Matrix Anal. Appl.*, 36(4), 1443-1464
- [32] A. Kuznetsov (2015) “*Computing the truncated theta function via Mordell integral*”, *Math. Comp.*, 84, 2911-2926
- [31] D. Hackmann and A. Kuznetsov (2014) “*Asian options and meromorphic Levy processes*”, *Finance and Stochastics*, 18, 825-844.
- [30] T. Hasebe and A. Kuznetsov (2014) “*On free stable distributions*”, *Elect. Comm. in Probab.*, 19, article 56, 1-12.
- [29] J. Burridge, A. Kuznetsov, M. Kwasnicki and A. E. Kyprianou (2014) “*New families of subordinators with explicit transition probability semigroup*”, *Stoch. Proc. Appl.*, 124(10): 3480-3495.
- [28] A. Kuznetsov and M. Morales (2014) “*Computing the finite-time expected discounted penalty function for a family of Lévy risk processes*”, *Scandinavian Actuarial Journal*, 2014(1), 1-31.

- [27] A. Kuznetsov, A.E. Kyprianou, J.C. Pardo and A.R. Watson (2014) “*The hitting time of zero for a stable process*”, Electron. J. Probab. , 19 (paper 30), 1-35.
- [26] A. Kuznetsov (2013) “*On the convergence of the Gaver-Stehfest algorithm*”, SIAM J. Numer. Anal., 51(6): 2984-2998.
- [25] D. Hackmann and A. Kuznetsov (2013) “*A note on the series representation for the density of the supremum of a stable process*”, Elect. Comm. in Probab., 18, article 42, 1-5.
- [24] A. Kuznetsov (2013) “*On the density of the supremum of a stable process*”, Stoch. Proc. Appl., 123(3): 986-1003.
- [23] A. Kuznetsov and J.C. Pardo (2013) “*Fluctuations of stable processes and exponential functionals of hypergeometric Lévy processes*”, Acta Applicandae Mathematicae, 123(1): 113-139.
- [22] A. Kuznetsov (2013) “*Asymptotic approximations to the Hardy-Littlewood function*”, J. Comput. Appl. Math., 237(1): 603-613.
- [21] A. Kuznetsov, A.E. Kyprianou and V. Rivero (2013) “*The theory of scale functions for spectrally negative Lévy processes*”, Levy Matters II, Springer Lecture Notes in Mathematics, Vol. 2061: 97-186.
- [20] A. Kuznetsov and X. Peng (2012) “*On the Wiener-Hopf factorization for Lévy processes with bounded positive jumps*”, Stoch. Proc. Appl., 122(7): 2610-2638.
- [19] A. Kuznetsov, A.E. Kyprianou and J.C. Pardo (2012) “*Meromorphic Levy processes and their fluctuation identities*”, Ann. Appl. Probab., 22(3): 1101-1135.
- [18] A. Kuznetsov, J.C. Pardo and M. Savov (2012) “*Distributional properties of exponential functionals of Lévy processes*”, Electron. J. Probab., 17(8): 1-35.
- [17] A. Kuznetsov (2012) “*On the distribution of exponential functionals for Lévy processes with jumps of rational transform*”, Stoch. Proc. Appl., 122(2): 654-663.
- [16] A. Kuznetsov, A.E. Kyprianou, J.C. Pardo and K. van Schaik (2011) “*A Wiener-Hopf Monte-Carlo simulation technique for Lévy processes*”, Ann. Appl. Probab., 21(6): 2171-2190.
- [15] F. Hubalek and A. Kuznetsov (2011) “*A convergent series representation for the density of the supremum of a stable process*”, Elect. Comm. in Probab., 16: 84-95.
- [14] A. Kuznetsov (2011) “*On extrema of stable processes*”, Ann. Probab., 39(3): 1027-1060.
- [13] A. Kuznetsov (2011) “*Analytic proof of Pecherskii-Rogozin identity and Wiener-Hopf factorization*”, Theory Probab. Appl., 55(3): 432-443.
- [12] A. Kuznetsov (2010) “*Wiener-Hopf factorization for a family of Lévy processes related to theta functions*”, J. Appl. Probab., 47(4): 1023-1033.

- [11] A. Kuznetsov (2010) “*Wiener-Hopf factorization and distribution of extrema for a family of Lévy processes*”, Ann. Appl. Probab., 20(5): 1801-1830.
- [10] C. Albanese and A. Kuznetsov (2009) “*Transformations of Markov processes and classification scheme for solvable driftless diffusions*”, Markov Process. Relat. Fields, 15(4): 563-574.
- [9] T.R. Hurd and A. Kuznetsov (2009) “*On the first passage time for Brownian motion subordinated by a Lévy process*”, J. Appl. Probab., 46(1): 181-198.
- [8] A. Kuznetsov (2008) “*Expansion of the Riemann ξ function in Meixner Pollaczek polynomials*”, Canad. Math. Bull., 51(4): 561-569.
- [7] A. Kuznetsov (2008) “*On the Lanczos limit formula*”, Integral Transforms and Special Functions, 19(11): 853-858.
- [6] T.R. Hurd and A. Kuznetsov (2008) “*Explicit formulas for Laplace transform of stochastic integrals*”, Markov Process. Relat. Fields, 14(2): 277-290.
- [5] A. Kuznetsov (2007) “*Integral representations for the Dirichlet L -functions and their expansions in polynomials*”, Integral Transforms and Special Functions, 18(11): 827-835.
- [4] A. Kuznetsov (2007) “*On the Riemann-Siegel formula*”, Proc. R. Soc. A, 463(2086): 2557-2568.
- [3] T.R. Hurd and A. Kuznetsov (2007) “*Affine Markov chain model of multifirm credit migration*”, Journal of Credit risk, 3(1): 3-29.
- [2] C. Albanese and A. Kuznetsov (2005) “*Affine lattice models*”, International Journal of Theoretical and Applied Finance (IJTAF), 8(2):223-238.
- [1] C. Albanese and A. Kuznetsov (2004) “*Unifying volatility models*”, Risk Magazine, 17(3): 94-98.

Submitted papers

- [4] A. Kuznetsov “*Computing the Barnes G -function in the entire complex plane*”
- [3] W. Bryc and A. Kuznetsov “*Markov limits of steady states of the KPZ equation on an interval*”
- [2] W. Bryc, A. Kuznetsov, Y. Wang and J. Wesolowski “*Markov processes related to the stationary measure for the open KPZ equation*”
- [1] S.I. Kalmykov, D. Karp and A. Kuznetsov “*A new identity for the sum of products of generalized basic hypergeometric functions*”

Recent presentations (since 2013)

- June 2021 “On ordered beta distributions and their applications”, online Zoom presentation at the CMS Summer Meeting
- June 2020 “Levy processes and Special Functions”, online Zoom seminar ”Complex Approximations, Orthogonal Polynomials and Applications”

- May 2019 “General risk aggregation: is gamma the new normal?”, 2019 Annual Meeting of the Statistical Society of Canada, Calgary, Canada
- May 2019 “Exponential functionals of Lévy processes and variable annuity guaranteed benefits”, 2019 Annual Meeting of the Statistical Society of Canada, Calgary, Canada
- March 2019 “Free regular convolution semigroups and their classical analogues”, Workshop “Free probability: the applied perspective”, CRM, Montreal, Canada
- June 2018 “Extrema of stable processes and number theory”, workshop on “Self-similarity, long-range dependence and extremes”, Oaxaca, Mexico
- December 11, 2017 “Lognormal convolutions and their applications”, CMS Winter meeting, Waterloo
- July 26, 2017 “Free stable distributions”, Mathematical Congress of the Americas, Montreal
- November 9, 2016 “Fractional Laplace operator and Meijer G-function”, Workshop on stable processes, Oaxaca, Mexico
- July 11, 2016 “Reinforced Polya urns”, World Congress in Probability and Statistics, Toronto
- April 15, 2016 “Reinforced Polya urns”, Probability Seminar, Department of Mathematics, University of Rochester, USA
- April 5, 2016 “The hitchhiker’s guide to Lévy processes”, Smith School of Business, Queens University, Kingston
- March 31, 2016 “Reinforced Polya urns”, CRM Probability Seminar, McGill University, Montreal
- October 6, 2015 “On tail dependence of the Gaussian copula”, Industrial-Academic Workshop on Optimization in Finance and Risk Management. Fields Institute, Toronto
- September 30, 2015 “How hard is it to compute a finite sum?”, International Conference on Analysis, Applications and Computations: In Memory of Lee Lorch. Fields Institute, Toronto
- June 9, 2015 “Spectral analysis of stable processes on the half-line”, Adventures in Self-Similarity Conference, Cornell University, Ithaca, USA
- May 10, 2015 “Hardy-Littlewood function: a nightmare for numerical analysts”, International Conference on Orthogonal Polynomials and q-Series, University of Central Florida, Orlando, USA
- October 18, 2014 “On special functions arising in the theory of stochastic processes”, AMS Sectional Meeting, Halifax
- June 23, 2014 “Numerical methods for Lévy processes”, CAIMS meeting, Saskatoon
- May 28, 2014 “Numerical methods for Lévy processes”, Statistical Society of Canada annual meeting, Toronto
- March 24, 2014 “Numerical methods for Lévy processes”, Cornell University, Ithaca, USA
- January 8, 2014 “On extrema of stable processes”, NZ Probability Workshop, Te Anau, New Zealand

- November 6, 2013 “Analytical theory of exponential functionals”, Lévy processes and self-similarity, Hammamet, Tunisia
- July 31, 2013 “The hitting time of zero for a stable process”, 36th Conference on Stochastic Processes and Their Applications, Boulder, Colorado, USA
- July 18, 2013 “On extrema of stable processes”, 7th International Conference on Lévy Processes, Wrocław, Poland
- March 21, 2013 “Numerical methods for Lévy processes”, three lectures at the Workshop on Numerical Methods in Finance, Western University, London, Canada
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Colloquium lectures

- March 9, 2017 “The hitchhiker’s guide to Lévy processes”, Department of Mathematical Sciences, University of Cincinnati, USA
- April 28, 2015 “The hitchhiker’s guide to Lévy processes”, Department of Mathematics, University of Illinois at Urbana-Champaign, USA
- February 5, 2015 “From Lévy processes to Number Theory and beyond”, Department of Mathematics, Ryerson University, Toronto
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Editorial work

- 2016 - 2020 Associate editor of the Journal of Applied Probability
- 2016 - 2020 Associate editor of Advances in Applied Probability
- 2012 - 2017 Associate editor of Stochastics (An International Journal of Probability and Stochastic Processes)
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External professional activities

Two lectures “Computing the Wiener-Hopf factors for Levy processes” at the Summer School on Wiener-Hopf technique, its generalisations and applications, August 5-9, 2019

Isaac Newton Institute for Mathematical Sciences, Cambridge, UK

A course of lectures “Complex analytical methods in the theory of Lévy processes” at the Summer School on Lévy processes, July 18-22, 2016

Université de Lille 1, France

Reviewing papers for: Annals of Probability, Probability Theory and Related Fields, Annals of Applied Probability, Electronic Journal of Probability, Journal of Applied Probability, Journal of Theoretical Probability, Stochastic Processes and their Applications, Operations Research Letters, SIAM Journal of Financial Mathematics, Mathematical Finance, Quantitative Finance, International Journal of Theoretical and Applied Finance, IMA Journal of Management Mathematics, Journal of Computational and Applied Mathematics, IMA Journal of Numerical Analysis, Scandinavian Actuarial Journal, Proceedings of the American Mathematical Society, Inverse Problems, Abstract and Applied Analysis

International research invitations:

University of Bath, July 2010 and June 2013, visiting Andreas Kyprianou
University of Auckland, December 2013-January 2014, visiting Mark Holmes
Cornell University, March 2014, visiting Pierre Patie

Conferences/workshops organised

Co-organizer of a session “Special functions and their applications” at the 2019 Winter Meeting of the Canadian Mathematical Society, December 7-9, 2019

Co-organizer of the “Pre-World Congress Meeting of New Researchers in Statistics and Probability” at Fields Institute, July 8-9, 2016

Co-organizer of the workshop “Stable processes” at The Casa Mathematica Oaxaca, Mexico, November 6-11, 2016

Service

2021-present	Chair of the MA Admissions Committee
2021-present	Appeals and Academic Honesty Committee, Faculty of Graduate Studies
2017-2020	Graduate Program Director (department of Mathematics and Statistics)
2018-2020	Adjudicating Committee (Applied Mathematics Section, department of Mathematics and Statistics)
2017-2018	Chair of the file preparation committee for promotion to Professor (department of Mathematics and Statistics)
2016-2019	Senate Appeals Committee
2016-2017	Chair of the PhD Committee
2014 - 2017	Canadian Mathematical Olympiad Committee (Canadian Mathematical Society)
2014 - 2017	Executive Committee (department of Mathematics and Statistics)
2014 - 2017	Chair of the High School Liaison Committee
2015-2017	YUFA steward
2014 - 2016	FGS Petitions Committee
2014 - 2016	PhD Committee
2014-2015	50th Anniversary Committee
2014	Curriculum Committee (Applied Mathematics Section, department of Mathematics and Statistics)
2012 - 2013	Chair of the Curriculum Committee (Applied Mathematics Section, department of Mathematics and Statistics)
2011 - 2012	Postdoctoral Committee

2011 - 2013	Adjudicating Committee (Applied Mathematics Section, department of Mathematics and Statistics)
2011 - present	Organizer of the Probability Seminar (department of Mathematics and Statistics)
January 2010 - June 2011	organizer of the weekly Mathematical Finance seminar (Fields Institute)
2009 - 2012	Curriculum Committee (Math for Commerce)
2009 - 2012	Curriculum Committee (Applied Mathematics Section, department of Mathematics and Statistics)
2009 - 2011	organizer of the Applied and Industrial Mathematics Seminar
2008 - 2013	Graduate Executive Committee
2008 - 2013	Coordinator of the Graduate Diploma in Financial Engineering program
2008 - 2013	Financial Engineering Coordination Committee
2008 - 2012	PhD Committee

PhD examining committees

2020	Member of the Examining Committee for the PhD defense of Eugene Furman (Schulich School of Business, York University)
2019	External examiner for the PhD defence of Min Wang (Department of Mathematics, Université de Lille, Lille, France)
2019	External examiner for the PhD defence of Jeff Wong (Department of Statistics and Actuarial Science, University of Waterloo, Waterloo, Canada)
2015	Member of the Examining Committee for the PhD defence of Jianxi Su (Department of Mathematics and Statistics, York University)
2015	External examiner for the PhD defence of Shen Shan (Department of Statistical and Actuarial Sciences, Western University, London, Canada)
2015	External examiner for the PhD defence of Chen Yang (Department of Statistical and Actuarial Sciences, Western University, London, Canada)
2014	Chair and Dean's representative for the PhD defence of Haohan Huang (Department of Mathematics and Statistics, York University)
2014	Member of the Examining Committee for the PhD defence of Ikjyot Singh Kohli (Department of Physics and Astronomy, York University)
2014	Chair and Dean's representative for the PhD defence of Oliver Jovanovski (Department of Mathematics and Statistics, York University)
2013	Member of the Examining Committee for the PhD defence of David Rosa (Department of Chemistry, York University)
2010	Member of the Examining Committee for the PhD defence of Shahla Molahajloo (Department of Mathematics and Statistics, York University)

Teaching (York University)

Undergraduate

MATH 1025 “Applied Linear Algebra” – taught online (I was the course director in the Fall term of 2021)
MATH 1013 “Applied Calculus I” (I was the course director in the Fall term of 2015)
MATH 1014 “Applied Calculus II” (I was the course director in the Winter term of 2016)
MATH 1530 “Introductory Mathematics for Economists I”
MATH 2280 “Mathematical Theory of Interest”
MATH 3141 “Elementary Number Theory”
MATH 4000 “Individual Project”
MATH 4143 “Scientific Computations for Finance Applications”
MATH 4280 “Risk Theory: Loss Models and Risk Measures”
MATH 4281 “Risk Theory: Ruin and Credibility”

Graduate

MATH 6911 “Numerical Methods in Finance”

Curriculum development (York University)

2017-2018 developed a new course: MATH 3282 “Mathematical Finance”
2017-2018 developed a new (Specialized Honours BA and BSc) Financial Mathematics stream in Applied Mathematics program
2009 developed a new course: MATH 2281 “Financial Economics”

Supervision (Postdoctoral)

2009-2010 Xianhua Peng (co-supervised with Tom Salisbury), Fields Ontario Postdoctoral Fellow, Ph.D. (Columbia), York University/Fields Institute

Supervision (Ph.D.)

2020 - present Armin Mohammadi
2016 - present Justin Miles
2013 - 2017 Fenghao Yang, co-supervised with Tom Salisbury, Ph.D. Thesis “On guaranteed minimum maturity benefits and first-to-default type problems”, defended in November 2017
2011-2015 Daniel Hackmann, Ph.D. Thesis “Analytical methods for Lévy processes with applications to finance” defended in June 2015

Supervision (M.A.)

2020	Guanfu Qiao, research paper for the Graduate Diploma in Financial Engineering
2019	Kaveh Arabpour, research paper for the Graduate Diploma in Financial Engineering
2017	Hassan Chehaitli, M.A. survey paper
2016	Snezhana Kirusheva, research paper for the Graduate Diploma in Financial Engineering
2012	Denis Kourktchan, research paper for the Graduate Diploma in Financial Engineering
2012	Branislav Nikolic, research paper for the Graduate Diploma in Financial Engineering
2011	Wei Huang, research paper for the Graduate Diploma in Financial Engineering
2010-2011	Daniel Hackmann, M.A. thesis “The optimal dividend problem for two families of meromorphic Lévy processes” defended in August 2011
2010	Kaijie Cui, survey paper
2010	Yang Liao, research paper for the Graduate Diploma in Financial Engineering

Supervision (Undergraduate)

2020	Nazanin Ghelichi, NSERC Undergraduate Student Research Award
2015	Syed Asghar, Research Assistant (Undergraduate)
2014	Sandeep Saju, NSERC Undergraduate Student Research Award
2013	Iain Page, NSERC Undergraduate Student Research Award
2009	Anton Tenyakov, NSERC Undergraduate Student Research Award

Toronto, ON, September 28, 2021