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Nurgissa Yessirkegenov

Education

2016–2020	**Ph.D. in Mathematics**, *Imperial College London*, London, UK
Thesis Advisor	Michael Ruzhansky
2013–2015	**M.Sc. in Mathematics**, *Al-Farabi Kazakh National University*, Almaty, Kazakhstan
	Diploma with Honours
Thesis Advisor	Tynysbek Kal'menov
2009–2013	**B.Sc. in Mathematics**, *Al-Farabi Kazakh National University*, Almaty, Kazakhstan
	Diploma with Honours
Thesis Advisor	Makhmud Sadybekov

Employment

Aug 2024 - present	**Associate Professor**, *KIMEP University*, Almaty, Kazakhstan
Feb 2025 - Jun 2025	**Interim Dean of the School of Computer Science and Mathematics**, *KIMEP University*, Almaty, Kazakhstan
Sep 2022 -Aug 2024	**Associate Professor**, *Suleyman Demirel University*, Kaskelen, Kazakhstan
Sep 2021 -Aug 2022	**Assistant Professor**, *Suleyman Demirel University*, Kaskelen, Kazakhstan
May 2011 - present	**Senior Researcher**, *Institute of Mathematics and Mathematical Modeling*, Almaty, Kazakhstan
Oct 2019 - Oct 2021	**Postdoctoral Fellow**, *Ghent University*, Ghent, Belgium
Jan 2017- May 2018	**Graduate Teaching Assistant**, *Imperial College London*, London, UK

Publications

1. (with P. Roychowdhury and D. Suragan) Critical, stability and higher-order analysis for Hardy type inequalities on Cartan-Hadamard manifolds. **Mathematische Zeitschrift**, 311: art. no. 57, 2025.

2. (with M. Ruzhansky and Y. Shaimerdenov) Cylindrical extensions of critical Sobolev type inequalities and identities. **Journal of Mathematical Analysis and Applications**, 554: art. no. 129899, 2026.

3. (with Y. Shaimerdenov) Cylindrical critical Hardy type inequalities and identities. **Journal of Mathematical Sciences**, 291:135–147, 2025.

4. (with M. Ruzhansky) Hypoelliptic functional inequalities. **Mathematische Zeitschrift**, 307: art. no. 22, 2024.

5. (with M. Ruzhansky) Hardy-Sobolev-Rellich, Hardy-Littlewood-Sobolev and Caffarelli-Kohn-Nirenberg inequalities on general Lie groups. **Journal of Geometric Analysis**, 34: art. no. 223, 2024.

6. (with D. Suragan) Sharp remainder of the Poincaré inequality for Baouendi–Grushin vector fields. **Asian-European Journal of Mathematics**, 16: art. no. 2350041, 2023. DOI:10.1142/S1793557123500419

7. (with A. Velicu) Rellich, Gagliardo-Nirenberg and Caffarelli-Kohn-Nirenberg inequalities for Dunkl operators and applications. **Israel Journal of Mathematics**, 247:741–782 (2022).

8. (with M. Ruzhansky) Hardy, weighted Trudinger-Moser and Caffarelli-Kohn-Nirenberg type inequalities on Riemannian manifolds with negative curvature. **Journal of Mathematical Analysis and Applications**, 507(2): art. no. 125795, 2022.

9. (with M. Ruzhansky) Existence and non-existence of global solutions for semilinear heat equations and inequalities on sub-Riemannian manifolds, and Fujita exponent on unimodular Lie groups. **Journal of Differential Equations**, 308:455–473, 2022.

10. (with M. Ruzhansky) A comparison principle for higher order nonlinear hypoelliptic heat operators on graded Lie groups. **Nonlinear Analysis, Theory, Methods and Applications**, 215, art. no. 112621, 2022. DOI:10.1016/j.na.2021.112621

11. (with M. Ruzhansky) Critical Sobolev, Gagliardo-Nirenberg, Trudinger and Brezis-Gallouet-Wainger inequalities, best constants, and ground states on graded groups. **Communications in Contemporary Mathematics**, art. no. 2150061. DOI: 10.1142/S0219199721500619

12. (with D. Suragan) Generalised nonlinear Picone identities for p-sub-Laplacians and p-biharmonic operators and applications. **Advances in Operator Theory**, 6(3), art. no. 53, 2021.

13. (with M. Ruzhansky) Factorizations and Hardy-Rellich inequalities on stratified groups. **Journal of Spectral Theory**, 10:1361–1411, 2020.

14. (with M. Ruzhansky and N. Tokmagambetov) Best constants in Sobolev and Gagliardo-Nirenberg inequalities on graded groups and ground states for higher order nonlinear subelliptic equations. **Calculus of Variations and Partial Differential Equations**, 59, Art. 175, 2020. `https://doi.org/10.1007/s00526-020-01835-0`

15. (with M. Ruzhansky and D. Suragan) Euler semigroup, Hardy-Sobolev and Gagliardo-Nirenberg type inequalities on homogeneous groups. **Semigroup Forum**, 101:162-191, 2020.

16. Function spaces on Lie groups and applications. **Ph.D. Thesis, Imperial College London**, 2020. DOI:https://doi.org/10.25560/80802

17. (with M. Ruzhansky) Very weak solutions to hypoelliptic wave equations. **Journal of Differential Equations**, 268:2063–2088, 2020.

18. (with M. Ruzhansky) Limiting cases of Sobolev inequalities on stratified groups. **Proceedings of the Japan Academy Series A - Mathematical Sciences**, 95(8):83–87, 2019.

19. (with A. Laptev and M. Ruzhansky) Hardy inequalities for Landau Hamiltonian and for Baouendi-Grushin operator with Aharonov-Bohm type magnetic field. Part I. **Mathematica Scandinavica**, 125(2):239–269, 2019.

20. (with M. Ruzhansky) Rellich inequalities for sub-Laplacians with drift. **Proceedings of the American Mathematical Society**, 147(3):1335–1349, 2019.

21. (with M. Ruzhansky) New Progress on Weighted Trudinger-Moser and Gagliardo-Nirenberg, and Critical Hardy Inequalities on Stratified Groups. In: Boggiatto P. et al. (eds) *Landscapes of Time-Frequency Analysis.* **Applied and Numerical Harmonic Analysis**, pages 277–289. **Birkhäuser, Cham**, 2019. `https://doi.org/10.1007/978-3-030-05210-2_11`

22. (with M. Ruzhansky and D. Suragan) Extended Caffarelli-Kohn-Nirenberg inequalities, and remainders, stability, and superweights for L_p-weighted Hardy inequalities. **Transactions of the American Mathematical Society, Series B**, 5:32–62, 2018.

23. (with M. Ruzhansky and D. Suragan) Sobolev type inequalities, Euler-Hilbert-Sobolev and Sobolev-Lorentz-Zygmund spaces on homogeneous groups. **Integral Equations and Operator Theory**, 90(1), Art. 10, 33 pp., 2018.

24. (with M. Ruzhansky and D. Suragan) Hardy-Littlewood, Bessel-Riesz, and fractional integral operators in anisotropic Morrey and Campanato spaces. **Fractional Calculus and Applied Analysis**, 21(3):577–612, 2018.

25. Spectral properties of the generalized Samarskii-Ionkin type problems. **Filomat**, 32(3):1019–1024, 2018.

26. (with M. Sadybekov and A. Dukenbayeva) On a Generalised Samarskii-Ionkin Type Problem for the Poisson Equation. In: Ibragimov Z., Levenberg N., Rozikov U., Sadullaev A. (eds) *Algebra, Complex Analysis, and Pluripotential Theory. USUZCAMP 2017*, volume 264 of *Springer Proceedings in Mathematics & Statistics*, pages 207–216. **Springer, Cham**, 2019. `https://doi.org/10.1007/978-3-030-01144-4_17`

27. (with M. Ruzhansky and D. Suragan) Caffarelli-Kohn-Nirenberg and Sobolev type inequalities on stratified Lie groups. **Nonlinear Differential Equations and Applications NoDEA**, 24(5), Art. 56, 2017.

28. (with M. Ruzhansky and D. Suragan) Extended Caffarelli–Kohn–Nirenberg inequalities and superweights for L^p-weighted Hardy inequalities. **Comptes Rendus Mathematique**, 355(6):694–698, 2017.

29. (with M. Sadybekov) Spectral properties of a boundary value problem with shift for the wave equation. **Russian Mathematics**, 60(3):41–46, 2016. `https://doi.org/10.3103/S1066369X16030051`

30. (with M. Sadybekov) Boundary value problems for wave equations with data on the whole boundary. **Electronic Journal of Differential Equations**, 2016(281), 9 pp., 2016.

31. (with M. Sadybekov) On a problem for the one dimensional wave equation with data on the whole boundary of the domain. **Mathematical Journal**, Vol. 15, No. 3(57):72–83, 2016 (in russian).

32. (with M. Sadybekov) Properties of solutions to Neumann-Tricomi problems for Lavrent'ev-Bitsadze equations at corner points. **Electronic Journal of Differential Equations**, 2014(193), 9 pp., 2014.

33. (with M. Sadybekov) A criterion strong solvability of Neumann-Tricomi problem in L_2 space for Lavrent'ev-Bitsadze's equation. **Mathematical Journal**, Vol. 13, No. 1(47):63–72, 2013 (in russian).

34. On a problem for the wave equation with data on the whole boundary. **The Bulletin of Al-Farabi Kazakh National University. Series of mathematics, mechanics, informatics**, 4(79):43–51, 2013 (in russian).

In preparation

(with M. Ruzhansky) Monograph-book: Noncommutative hypoelliptic analysis. **A Series of Comprehensive Studies in Mathematics, Springer**

(with A. Laptev and M. Ruzhansky) Hardy inequalities for Landau Hamiltonian and for Baouendi-Grushin operator with Aharonov-Bohm type magnetic field. Part II

Awards

2024	**Best Researcher Award 2024**, Ministry of Science and Higher Education of Kazakhstan
2023	**"Scopus Awards Kazakhstan 2023"**, Elsevier
2022	**"Best Researcher Award" of the Suleyman Demirel University**, Kazakhstan
2021	**State Youth Award "Daryn"**, Republic of Kazakhstan
2020-21	**State scientific scholarship for talented young scientists**, Ministry of Education and Science of the Republic of Kazakhstan
2019-20	**London Mathematical Society Early Career Fellowship**, London Mathematical Society, UK
2018	**Doris Chen Merit Award**, Department of Mathematics, Imperial College London, UK exceptional early promise and achievement in mathematical research.
2018	**Axioms Travel Award**, Switzerland
2018	**Doris Chen Mobility Award**, Department of Mathematics, Imperial College London, London, UK
2017	**Santander Mobility Award**, Department of Mathematics, Imperial College London, London, UK
2017	**Romberg Grant Award**, Heidelberg Laureate Forum and University of Heidelberg, Germany One of Top 200 Young Researchers Globally in 2017 by Heidelberg Laureate Forum
2015	**"Bolashak" scholarship**, Ministry of Education and Science of the Republic of Kazakhstan

Research Grants and Fellowships

2024-26	Grant of Ministry of Education and Science of Kazakhstan, "Cylindrical and hypoelliptic functional inequalities" (AP23490970) 2024-2026. **Head: Nurgissa Yessirkegenov**
2022-24	Grant of Ministry of Education and Science of Kazakhstan, "Magnetic functional inequalities" (AP14871691) 2022-2024. **Head: Nurgissa Yessirkegenov**
2021-23	Grant of Ministry of Education and Science of Kazakhstan, "Noncommutative hypoelliptic analysis" (AP09058474) 2021-2023. **Head: Nurgissa Yessirkegenov**
Oct 2019 - Apr 2020	London Mathematical Society Early Career Fellowship ECF-1819-12, London Mathematical Society, UK. **Head: Nurgissa Yessirkegenov**
Oct 2019 - Oct 2021	FWO Odysseus 1 grant, G.0H94.18N: "Analysis and Partial Differential Equations" 2021-2026. Head: Prof. Michael Ruzhansky

Feb 2016 - Jan 2020	Bolashak JSC "Center for international programs" Ministry of Education and Science of the Republic of Kazakhstan, Kazakhstan
2019-20	Grant of Ministry of Education and Science of Kazakhstan, "Boundary value problems of periodic type for Laplace equation in a ball and related direct and inverse parabolic problems" (AP05133271) 2018-2020. Head: Prof. Makhmud Sadybekov
2018	Travel grant by Axioms, MDPI (Switzerland) for participating the 12th International ISAAC Congress, University of Aveiro (Portugal), July 29 - August 02, 2019
2018	Travel grant by Doris Chen Mobility Fund (Imperial College London, UK) for participating the International Conference on Generalized Functions, University of Novi Sad (Serbia), August 27-31, 2018
2017	Travel grant by Santander Mobility Fund (Imperial College London, UK) for participating the 19th Annual Workshop on "Applications and Generalizations of Complex Analysis" and 23rd European Intensive Course on "Complex Analysis, its Generalizations and Applications", University of Aveiro (Portugal), March 23-30, 2018
2017	Romberg grant by Heidelberg Laureate Forum Foundation (Imperial College London, UK) for participating the 5th Heidelberg Laureate Forum, University of Heidelberg (Germany), September 23-29, 2017 One of Top 200 Young Researchers Globally in 2017 by Heidelberg Laureate Forum
2015-17	Grant of Ministry of Education and Science of Kazakhstan, "Non-local boundary value problems, construction of stable analytical and numerical methods" (No.0824/GF4) 2015-2017. Head: Prof. Makhmud Sadybekov
2015-17	Grant of Ministry of Education and Science of Kazakhstan, "Non strongly regular spectral problems: description of classes of boundary conditions and stability of basis property of root vectors " (No.0825/GF4) 2015-2017. Head: Prof. Nurlan Imanbaev
2012-14	Grant of Ministry of Education and Science of Kazakhstan, "Boundary value problems and their spectral properties for hyperbolic, parabolic, mixed and mixed-composite type equations" (No.0112RK00604) 2012-2014. Head: Prof. Makhmud Sadybekov
May 2011- Dec 2011	Grant of Ministry of Education and Science of Kazakhstan, "Spectral properties of root subspaces for the bundles of linear Fredholm and Noether operators" (No.0109RK01115) 2009-2011. Head: Prof. Makhmud Sadybekov

Talks and Participation to Conferences and Schools

August 2024	*Summer School Workshop II*, Ghent University, Ghent, Belgium
August 2024	*International Workshop on "Fundamental Problems in Mathematical and Theoretical Physics"*, Waseda University, Tokyo, Japan
Feb 2024	*Function Spaces, Analysis and Approximation*, Nazarbayev University, Astana, Kazakhstan
Oct 2023	*Functional Analysis in Interdisciplinary Applications*, Antalya, Turkey
Sep 2023	*International Conference on Approximation and Potential Theory*, Georgia Southern University, Savannah, USA
Apr 2023	*Annual International April Mathematical Conference*, Institute of Mathematics and Mathematical Modeling, Almaty, Kazakhstan
Dec 2022	*PDEs and Coercive Inequalities with Applications, Noncommutative Analysis - on Groups and Algebras, Quantum Information and Statistical Mechanics, Probability and Stochastics*, Instituto Argentino de Matemática "Alberto Calderón", CONICET, Buenos Aires, Argentina
Jan 2022	Invited speaker, *Recent Advances in Nonlinear Evolution Equations*, Organizers: Wenhui Chen and Alessandro Palmieri. `https://sites.google.com/view/ranee-workshop-2021/home/program?authuser=0`

Aug 2021	*The 13th ISAAC congress*, Ghent, Belgium
Aug 2020	*International Conference on Generalized Functions*, Ghent, Belgium
Feb 2020	Invited speaker, *Dispersive and subelliptic PDEs*, Centro Ennio De Giorgi, Pisa, Italy
Aug 2019	*The 12th ISAAC congress*, Aveiro, Portugal
May 2019	*Lecture Series "Hypoelliptic laplacian and applications"*, University of Freiburg, Germany
Aug 2018	*International Conference on Generalized Functions*, Novi Sad, Serbia
May 2018	*UK-Japan Workshop on Analysis of Nonlinear PDEs*, Swansea University, Swansea, UK
Apr 2018	*UK Network on Hyperbolic Equations and Related Topics*, University of Edinburgh, UK
Mar 2018	*23rd European Intensive Course*, University of Aveiro, Aveiro, Portugal
Dec 2017	*UK Network on Hyperbolic Equations and Related Topics*, Imperial College London, UK
Sep 2017	*The 5th Heidelberg Laureate Forum*, Heidelberg University, Heidelberg, Germany
Aug 2017	*The 11th ISAAC congress*, Linnaeus University, Vaxjo, Sweden
Jun 2017	*Analysis/Stochastic Analysis Intercontinental*, Imperial College London, London, UK
Jun 2017	*The Paris-London Analysis Seminar*, Institut Henri Poincare, Paris, France
Sep 2016	*Analysis and Partial Differential Equations*, Imperial College London, London, UK
Apr 2016	*Noncommutative Analysis and PDEs*, Imperial College London, London, UK
Nov 2015	*International conference on advancements in mathematical sciences*, Antalya, Turkey
Sep 2014	*2nd International Conference on Analysis and Applied Math.*, Shymkent, Kazakhstan
Jun 2014	*International conference "Spectral Theory and Differential Equations" devoted to the 100th anniversary of B. M. Levitan*, MSU, Moscow, Russia
Jun 2014	*5th World Congress of the Turkic World Mathematical Society*, Issyk-Kul, Kyrgyzstan
Nov-Dec 2012	*The II international conference of young scientists "Mathematical modeling of fractal processes, related problems of the analysis and computer science"*, Institute of Applied Mathematics and Automation, Nalchik, Russia
Sep 2011	*International Conference "Actual problems of modern mathematics, computer science and mechanics"*, Institute of Applied Mathematics and Automation, Institute of Mathematics and Mathematical Modeling, Almaty, Kazakhstan

Campus/Departmental Talks

Jul 2024	The Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea
Apr 2021	Ghent University, Ghent, Belgium
Feb 2020	Ghent University, Ghent, Belgium
Jan 2020	Imperial College London, London, UK
Sep 2019	Ghent University, Ghent, Belgium
Mar 2018	University of Aveiro, Aveiro, Portugal
June 2017	Analysis / Stochastic Analysis Intercontinental, Imperial College London, London, UK
Apr 2017	Al-Farabi Kazakh National University, Almaty, Kazakhstan
Sep 2016	Analysis and Partial Differential Equations, Imperial College London, London, UK
Mar 2015	Al-Farabi Kazakh National University, Almaty, Kazakhstan
Aug 2014	Mathematical Modeling Laboratory, MIMOS Berhad, Kuala Lumpur, Malaysia
Mar 2013	Institute of Mathematics and Mathematical Modeling, Almaty, Kazakhstan
Nov 2012	Al-Farabi Kazakh National University, Almaty, Kazakhstan

Teaching experience

2024-present	**Associate Professor** KIMEP University, Almaty, Kazakhstan
2022-2024	**Associate Professor** Suleyman Demirel University, Kaskelen, Kazakhstan
2021-2022	**Assistant Professor** Suleyman Demirel University, Kaskelen, Kazakhstan
2017-2018	**Graduate Teaching Assistant** Imperial College London, London, UK

Research Visits

Aug 2024	Department of Mathematics, Ghent University, Belgium
Jul-Aug 2024	Department of Applied Physics, Waseda University, Japan
Jul 2024	The Korea Advanced Institute of Science and Technology (KAIST), Daejeon, South Korea
Jul-Aug 2023	Department of Mathematics, Ghent University, Belgium
Apr 2019	Department of Mathematics, School of Science and Technology, Nazarbayev University, Nur-Sultan, Kazakhstan
Jan-Feb 2019	Department of Mathematics, Ghent University, Belgium
Apr 2017	Institute of Mathematics and Mathematical Modeling, Almaty, Kazakhstan
Aug 2014	Mathematical Modeling Laboratory, MIMOS Berhad, Kuala Lumpur, Malaysia

Co-organised Conferences

Jul 2025	*The 15th International ISAAC congress* , Astana, Kazakhstan. `https://isaac2025.org/committees/`
Oct 2023	*Functional Analysis in Interdisciplinary Applications*, Antalya, Turkey. `https://www.faia-2023.org/`
Sep 2016	*Analysis and Partial Differential Equation*, Imperial College London, UK. `http://wwwf.imperial.ac.uk/~ruzh/IC-conference-oda.htm`
Apr 2016	*Noncommutative Analysis and Partial Differential Equations*, Imperial College London, UK. `http://wwwf.imperial.ac.uk/~ruzh/IC-conference-noncommutative.htm`

Co-organised Seminars

2022-present	*SDU Analysis and PDE seminar*, Suleyman Demirel University, Kazakhstan. `https://sdu.edu.kz/engineering-and-natural-sciences/news-events/`

Professional Services

2024-present	Member of the Council of Young Scientists under the Ministry of Science and Higher Education of the Republic of Kazakhstan
2018-present	Reviewer for zbMATH, formerly Zentralblatt MATH
2018-present	Reviewer for Mathematical Reviews

Referee of papers for journals

Hiroshima Mathematical Journal, Journal of Geometric Analysis, Mathematische Nachrichten, Journal of the Mathematical Society of Japan, Mathematical Modelling of Natural Phenomena, Complex Variables and Elliptic Equations, Eurasian Mathematical Journal, Kazakh Mathematical Journal

References

Michael Ruzhansky, Ghent University and Queen Mary University of London, *michael.ruzhansky@ugent.be*

Ari Laptev, Imperial College London, *a.laptev@imperial.ac.uk*

Fulvio Ricci, Scuola Normale Superiore, *fulvio.ricci@sns.it*

Boguslaw Zegarlinski, Imperial College London, *b.zegarlinski@imperial.ac.uk*

Makhmud Sadybekov, Institute of Mathematics and Mathematical Modeling, *sadybekov@math.kz*

Shavkat Alimov, National University of Uzbekistan named after Mirzo Ulugbek, *sh_alimov@mail.ru*