

Curriculum Vitæ

Ryshard-Pavel Kostecki¹
(Ryszard Paweł Kostecki)²

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Personal information:

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ArXiv: arxiv.org/search/?searchtype=author&query=Kostecki%2C+R+P

Main research interests:

- *Theoretical physics:*
 - Quantum information theory;
 - Foundations of quantum theory;
 - Space-time emergence.
- *Mathematics:*
 - Quantum information geometry;
 - Operator algebras and functional analysis;
 - Category theory and topos theory.

Employment:

- since 01.2025: Postdoctoral Researcher at Research Center for Quantum Information, Slovak Academy of Sciences, Bratislava, Slovakia.
- 04.2023–12.2024: Assistant Professor at International Centre for Theory of Quantum Technologies, University of Gdańsk, Gdańsk, Poland.
- 10.2018–07.2020: Assistant Professor at National Quantum Information Centre, Faculty of Mathematics, Physics and Informatics, University of Gdańsk, Sopot, Poland.
- 06.2013–06.2016: Postdoctoral Researcher at Perimeter Institute for Theoretical Physics, Waterloo, Canada.

Grant and funding participation:

13. (since 2025) Participant of IMPULZ IM-2023-79 *Operational quantum thermodynamics* grant of Slovak Academy of Sciences.
12. (since 2025) Participant of VEGA 2/0164/25 *Quantum structures* grant of Slovak Academy of Sciences.
11. (since 2025) Participant of APVV-22-0570 *Design of higher-order quantum structures* grant of Slovak Research and Development Agency.
10. (2024–2028) Secondary proposer and participant of COST CA23115 *Relativistic quantum information* action of European Cooperation in Science and Technology.
9. (2023–2025) Participant of 2021/42/A/ST2/00356 *Relativistic causality and information processing* grant of Polish National Center of Science.
8. (2020–2022) Participant of MAB/2018/5 *International center for theory of quantum technologies* grant of Foundation for Polish Science.
7. (2018–2020) Participant of 2015/18/E/ST2/00327 *Security of communication facing eavesdropping and hacking, based on laws of physics* grant of Polish National Center of Science.
6. (2011–2013) Principal Investigator of N N202 343640 *Geometrical structures and dynamics in algebraic formulation of quantum theory* grant of Polish National Center of Science.
5. (2008–2011) Participant of 182/N QGG/2008/0 *Quantum gravity and quantum geometry* grant of Polish Ministry of Science and Higher Education.
4. (2007–2010) Participant of MISTRZ *Quantum and classical problems of relativity theory* scholarship of Polish Science Foundation.
3. (2010) Exchange Visit grant QGQG 2706 of European Science Foundation.
2. (2007) Short Visit grant QGQG 1955 of European Science Foundation.
1. (2002–2010) Scientific scholarship of Faculty of Physics, University of Warsaw.

¹I.e. Рышард-Павел Костецки. My birth name and legal name before emigration from Soviet Union. (Preferred in personal communication and in citations of my work.)

²Current legal name. (Used in formal documents.)

Awards:

- March 2012, *Templeton Frontiers* Postdoctoral Fellowship (3+2 years) at Perimeter Institute for Theoretical Physics, Waterloo, Canada.

Theses:

- 04.2013, Ph.D. in Theoretical Physics: *Information geometric foundations of quantum theory*. Faculty of Physics, University of Warsaw, Warszawa, Poland. Advisor: Jerzy Lewandowski. Referees: Jerzy Kijowski, Karol Życzkowski.
- 05.2005, M.Sc. in Physics: *The categorical foundations for general relativity*. Faculty of Physics, University of Warsaw, Warszawa, Poland. Supervisor: Jerzy Lewandowski. Referee³: Marek Zawadowski.

Education:

- 2005–2010: Graduate studies, Faculty of Physics, University of Warsaw, Warszawa, Poland.
- 2000–2005: Undergraduate studies, Faculty of Physics, University of Warsaw, Warszawa, Poland:
 - 2003–2005: Individual studies plan (supervisor: Jerzy Lewandowski);
 - 2000–2002: Extended mathematical studies plan (“potok C”).
- 1996–2000: Secondary education in the experimental mathematical–scientific class, IXth General Education Liceum (im. Klementyny z Tańskich Hoffmanowej), Warszawa, Poland.

Publications in journals:

5. Horodecki K., Studziński M., Kostecki R.-P., Sakaya O., Yang D. (杨东), 2021, *Upper bounds on the leakage of private data and operational approach to markovianity*, Phys. Rev. A **104**:052422, 1–17. [arXiv:2107.10737](#).
4. Horodecki K., Kostecki R.-P., Salazar R., Studziński M., 2020, *Limitations for private randomness repeaters*, Phys. Rev. A **102**:012615, 1–13. [arXiv:2003.07086](#).
3. Hellmann F., Kamiński W., Kostecki R.-P., 2016, *Quantum collapse rules from the maximum relative entropy principle*, New J. Phys. **18**:013022, 1–7. [arXiv:1407.7766](#).
2. Kostecki R.-P., 2011, *The general form of γ -family of quantum relative entropies*, Open Syst. Inform. Dynam. **18**, 191–221. [arXiv:1106.2225](#).
1. Srebrny J., Czosnyka T., Droste C., Rohoziński S.G., Próchniak L., Zając K., Pomorski K., Cline D., Wu C.Y., Bäcklin A., Hasselgren L., Diamond R.M., Habs D., Körner H.J., Stephens F.S., Baktash C., Kostecki R.-P., 2006, *Experimental and theoretical investigations of quadrupole collective degrees of freedom in ^{104}Ru* , Nucl. Phys. A **766**, 25–51. [www.fuw.edu.pl/~kostecki/104ru.pdf](#).

Publications in conference proceedings and extended abstracts:

5. Kostecki R.-P., 2025, *Geometry of the noncommutative and nonassociative Orlicz spaces, and continuity of the Vaĭnberg–Brègman projections*, in: Ivanov G.E., Podlipskaya O.G., Sakbaev V.Zh. (eds.), *Sbornik tezisov mezhdunarodnoĭ konferencii «Teoriya funkciĭ i eĭ prilozheniya», posvyashĕnnoĭ 120-letiyu so dnya rozhdeniya akademika RAN Sergeya Mikhaĭlovicha Nikol’skogo*, Moskovskĭ Fiziko-Tekhnicheskĭ Institut, Moskva, pp. 83–85. [www.mathnet.ru/ConfLogos/2526/MFTI_Nikolsky_2025\(13_07_25\).pdf](#).
4. Kostecki R.-P., 2025, *Geometric properties of noncommutative Orlicz spaces with p -Amemiya norms in the context of metric and Vaĭnberg–Kachurovskĭ–Brègman projections*, in: Wisła M. (ed.), *Function spaces 13. Conference proceedings. In memory of Henryk Hudzik and Julian Musielak. 8-12 July 2024, Poznań*, Faculty of Mathematics and Computer Science, Adam Mickiewicz University, Poznań, pp. 287–306. [zenodo.org/records/14996245](#).
3. Kostecki R.-P., 2012, *Information dynamics and new geometric foundations for quantum theory*, in: D’Ariano M., Fèi S.M. (費少明), Haven E., Hiesmayr B., Jaeger G. (eds.), *Foundations of Probability and Physics – 6, Växjö, Sweden, 14–16 June 2011*, AIP Conf. Proc. **1424**, American Institute of Physics, Melville, pp. 200–205. [arXiv:1110.4492](#).
2. Kostecki R.-P., 2012, *On principles of inductive inference*, in: Goyal P., Giffin A., Knuth K.H., Vrscaj E.R. (eds.), *31st International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering, Waterloo, Ontario, Canada, 9–16 July 2011*, AIP Conf. Proc. **1443**, American Institute of Physics, Melville, pp. 22–31. [arXiv:1109.3142](#).
1. Kostecki R.-P., 2011, *Quantum theory as inductive inference*, in: Mohammad-Djafari A., Bercher J., Bessière P. (eds.), *Proceedings of the 30th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering*, AIP Conf. Proc. **1305**, American Institute of Physics, Melville, pp. 28–35. [arXiv:1009.2423](#).

³De iure a referee, de facto a co-supervisor.

Research preprints:

14. Kostecki R.-P., 2025, *Vainberg–Brègman relative entropy and quasinonexpansive operators*, arXiv:2511.14873.
13. Kostecki R.-P., 2023, *Generalised Brègman relative entropies: a brief introduction*, arXiv:2306.02412.
12. Kostecki R.-P., 2021, *Categories of Brègman operations and epistemic (co)monads*, arXiv:2103.07810.
11. Kostecki R.-P., Tylec T.I., 2017, *Equivalence of tensor products over a category of W^* -algebras*, arXiv:1712.07399.
10. Kostecki R.-P., 2017, *Towards postquantum Vainberg–Brègman relative entropies*, arXiv:1710.01837.
9. Kostecki R.-P., 2016, *Local quantum information dynamics*, arXiv:1605.02063.
8. Kostecki R.-P., 2014, *Quantum information geometry*, www.fuw.edu.pl/~kostecki/qig.pdf.
7. Kostecki R.-P., 2014, *Noncommutative Orlicz spaces over W^* -algebras*, arXiv:1409.0189.
6. Kostecki R.-P., 2014, *Lüders' and quantum Jeffrey's rules as entropic projections*, arXiv:1408.3502.
5. Kostecki R.-P., 2013, *W^* -algebras and noncommutative integration*, arXiv:1307.4818.
4. Duch P., Kostecki R.-P., 2011, *Quantum Schwarzschild space-time*, arXiv:1110.6566.
3. Kostecki R.-P., 2011, *An introduction to topos theory*, www.fuw.edu.pl/~kostecki/ittt.pdf.
2. Kostecki R.-P., 2009, *Differential geometry in toposes*, www.fuw.edu.pl/~kostecki/sdg.pdf.
1. Glinka Ł.A., Pervushin V.N., Kostecki R.-P., 2007, *Hamiltonian approach to conformal coupling scalar field in the general relativity*, arXiv:gr-qc/0703062.

Other science-related publications (in Polish):

- 3.–7. Kostecki R.-P., 2011, *Na przestrzeni dziejów: Jak liczyli starożytni...?*, *Matematyka* **375**, 29–30; **376**, 40–41; **377**, 38–39; **378**, 25–27; **379**, 12–13. [A series of articles on the history of development of mathematics in various cultures, www.fuw.edu.pl/~kostecki/histmat.pdf.]
2. Kostecki R.-P., 2010, *Korekta naukowa i przypisy*, in: Isaacson W., 2010, *Einstein. Jego życie, jego wszechświat*, W.A.B., Warszawa. [Scientific correction of, and additional scientific footnotes in, the Polish transl. of: Isaacson W., 2007, *Einstein: his life and universe*, Simon & Schuster, New York, www.fuw.edu.pl/~kostecki/isaacson-przypisy.pdf.]
1. Kostecki R.-P., 2002, *PANDA 3.0*, written for and distributed with: Mostowski J., Natorf W., Tomaszewska N., 2002, *Fizyka i astronomia*, WSiP, Warszawa. [Computer program for statistical data analysis, released together with the physics and astronomy textbook for high schools, www.fuw.edu.pl/~kostecki/panda4.pdf; latest version (5.0, 6.07.2004, coauthored with Konrad Grochowski): www.fuw.edu.pl/~kostecki/panda5.zip.]

Other science-related preprints (in Polish):

2. Kostecki R.-P., 2008, *W miarę krótki i praktyczny kurs L^AT_EX-a w π^e minut*, www.fuw.edu.pl/~kostecki/kurs_latexa.pdf [An introduction to L^AT_EX.]
1. Kostecki R.-P., 2007, *Wprowadzenie do teorii gier*, www.fuw.edu.pl/~kostecki/teoria_gier.pdf. [An introduction to game theory.]

Original courses, mini-courses, and supervised seminars:

4. *Quantum information geometric approach to foundations of quantum theory*: Sejny Summer Institute, Basic Research Community in Physics, Łumbie: July 2022 (mini-course of 4 lectures).
3. *Nonlinear quantum information processing with Brègman relative entropies*: Department of Mathematical Informatics, Graduate School of Informatics, Nagoya University, Nagoya: February–March 2020 (mini-course of 9 lectures).
2. *Underground seminar on foundations of quantum theory*: Faculty of Physics, University of Warsaw, Warszawa: July 2008, February–June 2011, February–May 2012; Perimeter Institute for Theoretical Physics, Waterloo: February–April 2014, November 2014–June 2015, February–April 2018; Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University, Praha: January 2023. www.fuw.edu.pl/~kostecki/underground.
1. *Mathematics for students of the humanities*: The Centre for Open and Multimedia Education, University of Warsaw, Warszawa: 2007–2013 (12 semesters in total; created and supervised jointly with Katarzyna Grunt-Mejer and Jacek Grunt-Mejer).

Supervision of master theses:

3. John DeBroda, 2015, *A quantum information geometric approach to renormalization*, University of Waterloo & Perimeter Institute of Theoretical Physics, Waterloo, Canada. (co-supervisor: Rafael Sorkin)⁴, arXiv:1609.09440.

⁴I was de iure a co-supervisor and de facto a primary supervisor.

2. Morten Ib Munk-Nielsen, 2015, *Quantum measurements from entropic projections*, University of Waterloo & Perimeter Institute of Theoretical Physics, Waterloo, Canada. (co-supervisor: Lucien Hardy)⁴, www.fuw.edu.pl/~kostecki/morten_essay.pdf.
1. Daniel Ranard, 2015, *An introduction to rigorous approaches to quantum field theory*, University of Waterloo & Perimeter Institute of Theoretical Physics, Waterloo, Canada. (co-supervisor: Lucien Hardy)⁴, www.fuw.edu.pl/~kostecki/daniel_essay.pdf.

Conference coorganisation:

10. Scientific and local coorganisation of *Geometry of classical and quantum space-times. Jerzy Lewandowski Memorial Conference*, Banach Center, Institute of Mathematics, Polish Academy of Sciences, Warszawa, 15–19.09.2025. jurekmemorial.fuw.edu.pl.
9. Local coorganisation of *Isolated horizons and near horizon geometries, loop quantum gravity, CR structures and spacetimes, Einstein equations and the twistor equation*, University of Warsaw, Warszawa, 16–20.09.2019. jurekfest.fuw.edu.pl.
8. Scientific and local coorganisation of *Information Theoretic Foundations for Physics Conference*, Perimeter Institute for Theoretical Physics, Waterloo, 11–15.05.2015. perimeterinstitute.ca/conferences/information-theoretic-foundations-physics.
7. Scientific and local co-organisation of *Rethinking Foundations of Physics Workshop*, University of Regensburg, Dornstätt, 28.03–4.04.2015. jkleiner.de/research/workshops/rethinking-workshop.
6. Local coorganisation of *The 2nd Conference of the Polish Society on Relativity: 100 Years of General Relativity*, Stefan Banach International Mathematical Center and Faculty of Physics, University of Warsaw, Warszawa, 23–28.11.2015. potor.fuw.edu.pl/gr100y.
5. Local coorganisation of *The 20th International Conference on General Relativity and Gravitation (GR20)*, University of Warsaw, Warszawa, 7–13.06.2013. gr20-amaldi10.edu.pl.
4. Local coorganisation of *General Relativity and Gravitation – 50 years after Jabłonna*, Stefan Banach International Mathematical Center, Warszawa, 4–6.06.2012. www.fuw.edu.pl/~potor/jablonna.html.
3. Local coorganisation of *The Third Quantum Gravity & Quantum Geometry School*, University of Warsaw, Zakopane, 28.02–13.03.2011. www.fuw.edu.pl/~kostecki/school3.
2. Local coorganisation of *Loops and Foams'08 Workshop*, University of Warsaw, Zakopane, 3–9.03.2008. www.fuw.edu.pl/~kostecki/zakopane08.
1. Local coorganisation of *The First Quantum Gravity & Quantum Geometry School*, University of Warsaw, Zakopane, 23.03–3.04.2007. www.fuw.edu.pl/~kostecki/school.html.

Scientific societies:

- Member of *International Society for Quantum Gravity* from September 2021.
- Founding Committee Member and former Vice-chairman (January 2016–January 2017) of *Basic Research Community in Physics*, established in Leipzig in January 2016. basic-research.org.
- Founding Committee Member and Founding Member of *Polish Society on Relativity*, established in Warszawa in May 2011. potor.fuw.edu.pl/en.
- Former member of *Philosophy of Physics Society* (October 2022–October 2023).
- Former member of *American Physical Society* (November 2010–November 2011).

Other scientific activity:

- Coediting of a collection of articles *Geometry of classical and quantum space-times (Jerzy Lewandowski Memorial Conference)* in *General Relativity and Gravitation* journal (2025–2026). link.springer.com/collections/bacacgacba.
- Refereeing of papers for scientific journals: *Open Systems and Information Dynamics* (2025), *Reports on Mathematical Physics* (2024), *Foundations of Physics* (2020), *Philosophical Problems in Science* (2020).
- Editor of *Spadająca winda [Falling elevator]* column in *Fizyka w szkole [Physics in school]* journal (2005).
- Performer and co-author of exhibitions at *Festiwal nauki [Festival of science]* at Faculty of Physics, University of Warsaw, Warszawa (2002, 2003, 2006, 2007).
- Private tutoring in mathematics and physics in Warszawa (1998–2003).

Graduate teaching assistance:

6. *Advanced mathematics*, Faculty of Physics, University of Warsaw, September 2010.
5. *Classical mechanics*, Faculty of Physics, University of Warsaw, fall 2008.
4. *Fundamentals of modern physics*, Faculty of Physics, University of Warsaw, spring 2007.
3. *Computer science for biologists*, Faculty of Physics, University of Warsaw, spring 2007.
2. *Electrodynamics of macroscopic media*, Faculty of Physics, University of Warsaw, spring 2006.
1. *C++ programming*, Faculty of Physics, University of Warsaw, fall 2005.

Conference/workshop talks:

34. *Spectral presheaves over causal logics, and vacuum algebraic q.f.t. over curved space-times: a status report*, Mathematico-Physical Workshop in Kielnarowa, Wyższa Szkoła Informatyki i Zarządzania w Rzeszowie, Kielnarowa, 30.09.2025.
33. *Topos-theoretic extension of vacuum algebraic quantum field theory over curved space-times*, Geometry of classical and quantum space-times. Jerzy Lewandowski Memorial Conference, Banach Center, Institute of Mathematics, Polish Academy of Sciences, Warszawa, 18.09.2025.
32. *Topos-theoretic approach to vacuum algebraic quantum field theory over curved space-times*, The 11th Conference of the Polish Society on Relativity, University of Wrocław, Wrocław, 22.07.2025.
31. *Topos-theoretic approach to vacuum algebraic quantum field theory over curved space-times*, 22nd European Conference on Foundations of Physics, University of Gdańsk, Gdańsk, 30.06.2025.
30. *Extended Vainberg–Brègman relative entropies, projections, and quasi-nonexpansive operators over preduals of W^* - and JBW-algebras*, Mathematical Structures in Quantum Mechanics II, Instytut Fizyki Teoretycznej i Astronomii, Uniwersytet Gdański, Gdańsk, 29.03.2025.
29. *Jenseits von Haag und Dasein: Paraconsistency of relativistic nonsignalling and functorial vacuum pre-a.q.f.t. in causal spectral presheaves*, Mathematical Workshop in Kielnarowa, Wyższa Szkoła Informatyki i Zarządzania w Rzeszowie, Kielnarowa, 29.09.2024.
28. *Paraconsistency of relativistic nonsignalling, and some other features of causal spectral toposes*, Causalworlds 2024, Perimeter Institute for Theoretical Physics, Waterloo, 16.09.2024 (online). (PIRSA:24090141)
27. *Extended Vainberg–Kachurovskii–Brègman relative entropies over (post)quantum state spaces, and operational reference frames based on generalised spin factors*, 14th Annual Conference on Relativistic Quantum Information (North), Univerzita Karlova, Praha, 7.08.2024. (youtube:G5By6CsFFmU&t=6889s)
26. *Extended Vainberg–Kachurovskii–Brègman geometry and unital semigroups of nonlinear operators on state spaces of generalised probabilistic theories*, The 16th Biennial International Quantum Structures Association Conference, Centre “Leo Apostel”, Vrije Universiteit Brussel, Elsene/Ixelles, 24.07.2024.
25. *Geometric properties of noncommutative Orlicz spaces with p -Amemiya norms in the context of metric and Vainberg–Kachurovskii–Brègman projections*, Function spaces XIII, Uniwersytet im. Adama Mickiewicza, Poznań, 12.07.2024.
24. *Nonlinear generalised pythagorean geometry of quantum state spaces*, Categorical modifications of theories of physics Workshop, Wyższa Szkoła Informatyki i Zarządzania w Rzeszowie, Kielnarowa, 29.09.2023.
23. *Quantum Schwarzschild space-time: a toy model for space-time emergence from quantum information geometry*, 13th Annual Conference on Relativistic Quantum Information (North), Technical University of Crete, Chaniá, 18.07.2023.
22. *Brègman relative entropy and semigroups of nonlinear maps of (post)quantum states*, Mathematical Structures in Quantum Mechanics, Institute of Theoretical Physics and Astrophysics, Uniwersytet Gdański, Gdańsk, 20.06.2023.
21. *Postquantum Brègman entropic projections and quasi-nonexpansive operators: general structure and some resource-theoretic applications*, 54th Symposium on Mathematical Physics, Institute of Physics, Uniwersytet Toruński, Toruń, 11.06.2023.
20. *Brègman relative entropies and nonexpansive operators over state spaces of W^* - and JBW-algebras*, Mathematical physics, dynamical systems and infinite-dimensional analysis – 2021, Moskovskii Fiziko-Tekhnicheskii Institut, Dolgoprudnyĭ, 1.07.2021 (online). (www.mathnet.ru/php/presentation.phtml?presentid=31108)
19. *Two layers of inference*, 23rd Kraków Methodological Conference, Copernicus Center for Interdisciplinary Studies, Jagiellonian University, Kraków, 08.11.2019. (invited talk) (youtube:P08aWE3j01Y)
18. *Geometrisation of quantum theory beyond pure states and Hilbert spaces*, Isolated horizons and near horizon geometries, loop quantum gravity, CR structures and spacetime, Faculty of Physics, University of Warsaw, Warszawa, 19.09.2019. (invited talk) (youtube:oV6MK6Rqe5A)
17. *(Post)Quantum Brègman divergences, nonlinear resource theories, and renormalisation*, 51st Symposium on Mathematical Physics, Institute of Physics, Uniwersytet Toruński, Toruń, 16.06.2019.
16. *Operator-algebraic quantum foundations revisited*, 34th Workshop on Geometric Methods in Physics, University of Białystok, Białowieża, 30.06.2015.
15. *Quantum information geometric foundations: beyond the spectral paradigm*, Information Theoretic Foundations for Physics, Perimeter Institute, Waterloo, 14.05.2015. (PIRSA:15050090)
14. *Is physics just a statistical inference?*, Rethinking foundations of physics Workshop, Universität Regensburg, Dornfesten, 30.03.2015.
13. *From quantum information geometry to quantum nonmarkovian dynamics*, 51st Winter School of Theoretical Physics, University of Wrocław, Łądek Zdrój, 11.02.2015.

12. *Towards nonlinear quantum information geometric foundations of quantum theory*, 33rd Workshop on Geometric Methods in Physics, University of Białystok, Białowieża, 01.07.2014.
11. *Can we use quantum information geometry as a foundation for nonlinear quantum theory?*, 46th Symposium on Mathematical Physics, Institute of Physics, Uniwersytet Toruński, Toruń, 17.06.2014.
10. *Quantum information geometric foundations*, Quantum Theory from Problems to Advances, Linnaeus University, Växjö, 09.06.2014.
9. *From ontic/epistemic paradigm clashes towards new, general, quantum theory*, Paradigms of Modern Physics Workshop, University of Regensburg, Dorfgastein, 27.03.2014.
8. *Categories of quantum theoretic models*, International Category Theory Conference CT2011, University of British Columbia, Vancouver, 08.07.2011.
7. *Quantum entropy and information geometry based on non-commutative integration*, 30th Workshop of Geometric Methods in Physics, University of Białystok, Białowieża, 29.06.2011.
6. *New results on quantum relative entropy and quantum information geometry*, 43rd Symposium on Mathematical Physics, Institute of Physics, Uniwersytet Toruński, Toruń, 22.06.2011.
5. *Information geometric foundations of quantum theory*, Foundations of Probability and Physics 6, Linnaeus University, Växjö, 16.06.2011.
4. *Quantum theory as inductive inference*, 30th International Workshop on Bayesian Inference and Maximum Entropy Methods, Centre National de la Recherche Scientifique, Chamonix, 04.07.2010.
3. *Information dynamics and geometric foundations of quantum theory*, 42nd Symposium on Mathematical Physics, Institute of Physics, Uniwersytet Toruński, Toruń, 22.06.2010.
2. *The physical meaning of the modular theory and the measurement problem*, 4th Quantum Gravity Colloquium, Albert-Einstein-Institut, Golm, 07.05.2008.
1. *Modular automorphisms*, 3rd Quantum Gravity Colloquium, Nottingham University, Nottingham, 10.01.2008.

Selected seminar talks:

34. *Extended Vainberg–Brègman relative entropies over postquantum state spaces and semigroups of nonlinear operators*, Research Center for Quantum Information, Institute of Physics, Slovak Academy of Sciences, Bratislava, 10.12.2024.
33. *Geometry of Orlicz and Banach spaces, uniform homeomorphisms, and Vainberg–Brègman projections*, Faculty of Mathematics and Computer Science, Adam Mickiewicz University in Poznań, Poznań, 26.11.2024.
32. *Quantum Brègman geometry and operators*, Institute of Theoretical Physics, Jagiellonian University, Kraków, 17.01.2022.
31. *Optimal quantum inference: using nonlinear convex analysis on noncommutative Banach spaces*, Department of Mathematical Informatics, Nagoya University, Nagoya, 13.03.2020.
30. *Information geometric quantum foundations: new results & open problems*, National Quantum Information Centre, University of Gdańsk, Sopot, 11.09.2017.
29. *Quantum information geometric approach to foundations of quantum theory*, Seminar on Quantum Logics, Mathematical Institute, Slovak Academy of Sciences, Bratislava, 30.06.2016.
28. *Towards (post)quantum information relativity*, Quantum Foundations Seminar, Perimeter Institute for Theoretical Physics, Waterloo, 04.05.2016. (PIRSA:16050021)
27. *Towards geometric (and nonlinear) quantum information theory*, National Quantum Information Centre, University of Gdańsk, Sopot, 24.06.2015.
26. *Is mathematics the vanguard of culture? – Some sketches on anthropology of mathematics in the context of category theory*, Polish Academy of Arts and Sciences, Commission for Philosophy of Science, Kraków, 22.06.2015.
25. *Quantum information geometric approach to foundations of quantum theory*, Seminarium Zakładu Fizyki Matematycznej, Institute of Physics, Uniwersytet Toruński, Toruń, 21.04.2015.
24. *Quantum information geometry for quantum foundations (and emergence of space-time)*, Exact Results in Quantum and Gravity Seminar, Institute for Theoretical Physics, University of Warsaw, Warszawa, 17.04.2015.
23. *Revisiting the foundations of quantum theory with an artillery of quantum information geometry*, Center for Theoretical Physics, Polish Academy of Sciences, Warszawa, 15.04.2015.
(youtube:0VR3_oW2824)
22. *Quantum information geometry as a new foundation for quantum theory*, Kolloquium des Graduiertenkollegs, Fakultät für Mathematik, Universität Regensburg, Regensburg, 26.02.2015.
21. *Quantum information geometry as a foundation for quantum theory beyond quantum mechanics*, Special Seminar, Max–Planck–Institut für Mathematik in den Naturwissenschaften, Leipzig, 18.02.2015.

20. *Jaynes redux: maximum entropy and bayesianity in the foundations of quantum theory*, Physics Department Colloquium, University at Albany, Albany, 12.12.2014.
19. *New quantum kinematics and dynamics based on geometry of quantum information*, Mathematical Physics and Center for Coherence and Quantum Optics Seminar, University of Rochester, Rochester, 11.12.2014.
18. *Information: a new paradigm for the foundations of physics?*, Physics Department Colloquium, University of Rochester, Rochester, 10.12.2014.
17. *Quantum information geometric foundations: an overview*, Quantum Foundations Seminar, Perimeter Institute, Waterloo, 18.11.2014. (PIRSA:14110134)
16. *Foundational applications of nonlinear quantum geometries*, Quantum Information Seminar, Institute of Theoretical Physics, University of Warsaw, Warszawa, 03.10.2013.
15. *Information geometric foundations of quantum theory*, Ph.D. defense, Institute of Theoretical Physics, University of Warsaw, Warszawa, 24.04.2013.
14. *Nonlinear geometries and dynamics of quantum states*, Chaos and Quantum Information Seminar, Institute of Physics, Jagiellonian University, Kraków, 25.03.2013.
13. *Towards non-linear quantum information foundations of quantum theory*, Quantum Foundations Seminar, Perimeter Institute, Waterloo, 24.01.2012. (PIRSA:12010138)
12. *Information geometric foundations of quantum theory*, Quantum Foundations Seminar, Perimeter Institute, Waterloo, 12.07.2011.
11. *The emergence of space-time geometry from quantum theory*, Quantum Gravity Group Meeting, Perimeter Institute, Waterloo, 07.07.2011.
10. *Riemannian geometry on the spaces of quantum states*, Exact Results in Quantum and Gravity Seminar, Institute for Theoretical Physics, University of Warsaw, Warszawa, 08.10.2010.
9. *Riemannian and dual geometries on the spaces of probabilistic measures*, Exact Results in Quantum and Gravity Seminar, Institute for Theoretical Physics, University of Warsaw, Warszawa, 03.04.2009.
8. *General relativity histories*, Exact Results in Quantum and Gravity Seminar, Institute for Theoretical Physics, University of Warsaw, Warszawa, 30.11.2007.
7. *Quantum histories*, Exact Results in Quantum and Gravity Seminar, Institute for Theoretical Physics, University of Warsaw, Warszawa, 23.11.2007.
6. *Toposes and histories*, Theoretical Physics Student Seminar, Imperial College, London, 11.10.2007.
5. *Ponzano–Regge model for 2+1 quantum gravity*, Exact Results in Quantum and Gravity Seminar, Institute for Theoretical Physics, University of Warsaw, Warszawa, 15.12.2006, 05.01.2007, 12.01.2007.
4. *Category theory as a mathematical framework for the concept of inner relation*, Seminar on Categories of Reality in Shamanism, Daoism, and Buddhism, Centre for Studies on the Classical Tradition, University of Warsaw, Warszawa, 11.01.2006.
3. *Black holes in 45 minutes*, Theoretical Physics Seminar, Institute for Theoretical Physics, University of Warsaw, Warszawa, 13.11.2004.
2. *Inflation in cosmology*, Particle Physics Student Seminar, Institute for Theoretical Physics, University of Warsaw, Warszawa, 01.06.2004.
1. *Well-adapted topos models of synthetic differential geometry*, Category Theory Seminar, Faculty of Mathematics, University of Warsaw, Warszawa, 06.01.2004.

Posters:

9. *Models of paraconsistent logics in spectral presheaves*, 22nd European Conference on Foundations of Physics, University of Gdańsk, Gdańsk, 01.07.2025. (Joint work with Benjamin Engel.)
8. *Jenseits von Haag und Dasein: paraconsistency of relativistic nonsignalling and functorial vacuum pre-a.q.f.t. in causal spectral toposes*, Causalworlds 2024, Perimeter Institute for Theoretical Physics, Waterloo, 18.09.2024 (online).
7. *Extended Brègman entropic geometry and nonlinear operators on state spaces of GPTs*, XVth Symposium KCIK–ICTQT, National Quantum Information Centre, University of Gdańsk, Sopot, 17.05.2024.
6. *Nonlinear postquantum brègmanian inference and adjointness in epistemic foundations*, Vienna Quantum Foundations conference, Institute for Quantum Optics and Quantum Information, Austrian Academy of Sciences, Wien, 08.09.2021 (online).
5. *New approaches to resource theories: relative entropic transmitters & epistemic adjointness*, Quantum Information Days, Centrum Fizyki Teoretycznej Polskiej Akademii Nauk, Warszawa, 22.02.2021 (online).
4. *Epistemic comonads, entropic projections, and resource theories*, Applied Category Theory Conference, Department of Computer Science, University of Oxford, Oxford, 16.07.2019.

3. *Quantum theory as a causal inference: a nonlinear noncommutative approach*, Quantum [Un]Speakables II: 50 Years of Bell's Theorem, Universität Wien, Wien, 19.06.2014.
2. *Information geometric foundations of quantum theory*, 31st International Workshop on Bayesian Inference and Maximum Entropy Methods, University of Waterloo, Waterloo, 10.07.2011.
1. *Quantum information geometry and non-commutative flow of weights*, Information Geometry and Applications III, Max-Planck-Institut für Mathematik in den Naturwissenschaften, Leipzig, 02.08.2010.

Invited scientific visits:

27. July 2025, International Centre for Theory of Quantum Technologies, University of Gdańsk. Host: Paweł Horodecki.
26. November 2024, Institute of Mathematics, Poznań University of Technology. Host: Karol Leśniak.
25. November 2021–March 2023, Institute of Theoretical Physics and Astrophysics, University of Gdańsk, Gdańsk. Host: Marcin Marciniak.
24. February–June 2020, Department of Mathematical Informatics, Nagoya University, Nagoya. Host: Francesco Buscemi.
23. April–June 2018, Perimeter Institute, Waterloo. Host: Ravi Kunjwal.
22. October 2017–April 2018, Perimeter Institute, Waterloo. Host: Lucien Hardy.
21. September–October 2017, Perimeter Institute, Waterloo. Host: Ravi Kunjwal.
20. September 2017, National Quantum Information Centre, Sopot. Host: Michał Oszmaniec.
19. June–September 2017, Institute for Theoretical Physics, University of Warsaw, Warszawa. Host: Jerzy Lewandowski.
18. June 2016–March 2017, Perimeter Institute, Waterloo. Hosts: Lucien Hardy, Ravi Kunjwal.
17. June 2016, Mathematical Institute, Slovak Academy of Sciences, Bratislava. Host: Anna Jenčová.
16. June 2015, National Quantum Information Centre, Sopot. Host: Ryszard Horodecki.
15. June 2015, Copernicus Center, Kraków. Host: Michał Heller.
14. April 2015, Institute for Theoretical Physics, University of Warsaw, Warszawa. Host: Jerzy Lewandowski.
13. March 2015, Fakultät für Mathematik, Universität Regensburg, Regensburg. Host: Felix Finster.
12. December 2014, University at Albany, Albany. Host: Ariel Caticha.
11. December 2014, University of Rochester, Rochester. Host: Alice Quillen.
10. April 2012, University of Rome Tor Vergata, Roma. Host: Paolo Gibilisco.
9. January 2012, Perimeter Institute, Waterloo. Host: Lucien Hardy.
8. August 2011, Albert–Einstein–Institut, Golm. Host: Bianca Dittrich.
7. July 2011, Perimeter Institute, Waterloo. Host: Cecilia Flori.
6. January–February 2010, Imperial College, London. Host: Christopher Isham.
5. August 2008, Montréal University, Montréal. Host: Gonzalo Reyes.
4. September–November 2007, Nottingham University, Nottingham. Host: John Barrett.
3. February 2007, Joint Institute for Nuclear Research, Dubna. Host: Viktor N. Pervushin.
2. March 2006, Imperial College, London. Host: Christopher Isham.
1. April 2002, Eidgenössische Technische Hochschule, Zürich. Host: Gábor Székely.

Other conferences and workshops participated:

44. 2–6.06.2025, Lee's Fest: Quantum Gravity and the Nature of Time, Perimeter Institute for Theoretical Physics, Waterloo (online).
43. 14–17.04.2025, The Quantum Information Structure of Spacetime 2025, Institute for Quantum Optics and Quantum Information, Austrian Academy of Sciences, Wien.
42. 12–14.06.2024, Nicolas Berdyaev and Russian philosophy in the West, Faculty of Philosophy, Pontifical University of John Paul II, Kraków.
41. 24–26.05.2024, The 23rd Andrzej Jankowski memorial lecture, Faculty of Mathematics, Physics and Informatics, University of Gdańsk, Gdańsk.
40. 16–17.03.2024, Andrzej Grzegorzczak memorial conference, Department of Philosophy, University of Warsaw, Warszawa (online).
39. 24–25.11.2023, 3rd Annual meeting of Basic Research Community for Physics, Université de Namur, Namur.
38. 19–27.05.2023, Wandering Institute: Warsaw spring retreat, Basic Research Community for Physics, Osada Wilga.
37. 13.01.2023, Memorial event for Yuriï Ivanovich Manin, Max Planck Institute for Mathematics, Bonn (online).

36. 24–26.06.2022, The Quantum, the Thermal and the Gravitational Reconciled, Münchner Zentrum für Mathematische Philosophie, Ludwig-Maximilians-Universität München, München (online).
35. 30.05–3.06.2022, Informational architecture of spacetime, Okinawa Institute of Science and Technology, Okinawa (online).
34. 30.08–1.09.2021, 1st International Workshop on Oriental Logic, Arak University, Arak (online).
33. 14–17.06.2021, 52nd Symposium on Mathematical Physics, University of Toruń, Toruń (online).
32. 7–11.06.2021, 18th International Conference on Quantum Physics and Logic, University of Gdańsk, Gdańsk (online).
31. 10–14.07.2019, Quantum Causal Structures, University of Oxford, Oxford.
30. 23–25.05.2019, Quantum Resources and Their Application, University of Gdańsk, Sopot.
29. 9–13.04.2018, Algorithmic Information, Induction and Observers in Physics, Perimeter Institute, Waterloo.
28. 2–6.04.2018, Observers in Quantum and Foli Theories, Perimeter Institute, Waterloo.
27. 13–17.11.2017, The Path Integral for Gravity, Perimeter Institute, Waterloo.
26. 18–29.07.2016, It from Qubit Summer School, Perimeter Institute, Waterloo.
25. 12–17.06.2016, Information Geometry and its Applications IV, Academy of Sciences of the Czech Republic, Liblice.
24. 16–20.05.2016, Workshop on Homotopy Type Theory and Univalent Foundations of Mathematics, Fields Institute, Toronto.
23. 30.03–1.04.2016, Quantum Networks, Institut de Ciències Fotòniques, Barcelona.
22. 29.09–2.10.2014, Quantum Mathematical Physics, Universität Regensburg, Regensburg.
21. 23–28.09.2013, 7th Aegean Summer School: Beyond Einstein’s Theory of Gravity, National Technical University of Athens, Parikia.
20. 22–26.07.2013, Loops ’13, Perimeter Institute, Waterloo.
19. 10–13.06.2013, Quantum Foundations & Quantum Information, Linnaeus University, Växjö.
18. 4–6.06.2012, General Relativity and Gravitation – 50 years after Jabłonna, University of Warsaw, Warszawa and Jabłonna.
17. 12–13.09.2011, Operator Algebras and Quantum Groups 2011, University of Warsaw, Warszawa.
16. 28.02–4.03.2010, Loops & Foams 2010, University of Warsaw, Zakopane.
15. 23–24.10.2009, Marek-fest, University of Warsaw, Warszawa.
14. 2–7.08.2009, Loops ’09, Běijīng Normal University, Běijīng.
13. 29–31.07.2009, Algebraic Quantum Field Theory – the first 50 years, Univesität Göttingen, Göttingen.
12. 7.01.2009, Categories, Logic & Foundations of Physics IV, Imperial College, London.
11. 19–21.12.2008, Quantum Gravity in Kraków II, Uniwersytet Jagielloński, Kraków.
10. 3–5.09.2008, Workshop on Sheaves in Geometry and Quantum Theory, Nijmegen University, Nijmegen.
9. 30.06–4.07.2008, Quantum Gravity/Quantum Geometry, Nottingham University, Nottingham.
8. 25–28.06.2008, 40th Symposium on Mathematical Physics, University of Toruń, Toruń.
7. 14.05.2008, Categories, Logic & Foundations of Physics II, Imperial College, London.
6. 21–23.03.2008, 87th Peripatetic Seminar on Sheaves and Logic, Patras University, Patras.
5. 3–9.03.2008, Loops & Foams ’08, University of Warsaw, Zakopane.
4. 12–13.01.2008, Quantum Gravity in Kraków, Uniwersytet Jagielloński, Kraków.
3. 19.01.2008, Categories, Logic & Foundations of Physics, Imperial College, London.
2. 23.03–3.04.2007, Quantum Geometry & Quantum Gravity School, University of Warsaw, Zakopane.
1. 10–14.10.2005, Loops ’05, Albert Einstein Institute, Golm.

Scientometrics:

- Number of citations:⁵ 161.
- Hirsch number:⁵ 6.
- Erdős number:⁶ 4.

Languages (fluent):⁷

- *human*: English, Polish, Russian;
- *machine*: BASIC, C++, HTML, L^AT_EX.

Other interests:⁷

Cultural anthropology and semiotics, improvised dance, mountain and wilderness hiking, photography and visual arts, yoga (certified teacher).

⁵As of 5.10.2024. Including preprints and theses, excluding self-citations.
Complete list: www.fuw.edu.pl/~kostecki/rpk-citations.pdf.

⁶With at least two different paths. Attained for the first time through: F. Hellmann, J. Heitzig, and M. Erné.

⁷Alphabetically ordered.