

Curriculum Vitae



Photo:

Name: Pavlo

Surname: Gavrylenko

Place of birth: Ukraine, Kyiv

Date of birth: 12 July 1991

Citizenship: Ukraine

Marital status: Single

e-mails:

- pasha145@gmail.com
- pavlo.gavrylenko@sissa.it

Education:

1998-2004: School #210, Kyiv

2004-2008: Kyiv Natural Science Liceum #145

2008-2014: National Taras Shevchenko University of Kyiv (KNU), physical faculty, quantum field theory department, Bachelor of science, Master of science

2012-2018: NRU HSE, faculty of mathematics, mathematical physics department, Master of science, Candidate of science

2014-2017: Bogolyubov institute for theoretical physics, Kyiv, Ukraine

2016-2018: Skolkovo Institute of Science and Technology, Moscow, Russia

Bachelor degree: 2012, *Form-factors of twist fields in the lattice Dirac theory*, KNU, Ukraine

Advisor: Nikolai Iorgov

Master degree: 2014, *Quiver gauge theories*, KNU, NRU HSE

Advisor: Andrei Marshakov

PhD degree: 1 FEB 2018, *Isomonodromic deformations and conformal field theory with W-symmetry*, University of Amsterdam

Advisors: Andrei Marshakov, Eric Opdam

Candidate of science: *Isomonodromic deformations and quantum field theory*, NRU HSE, Moscow, Russia

Advisor: Andrei Marshakov

Scientific interests: Mathematical physics: integrable models, conformal field theory, isomonodromic deformations

Habilitations (Italy): Fascia II (01/A4 Fisica Matematica, 01/A2 Geometria e Algebra)

Languages: Ukrainian, Russian, English, (now learning Italian)

Personal page: <https://people.sissa.it/~pagavryl/>

List of papers: https://arxiv.org/a/gavrylenko_p_1.html

Google scholar: <https://scholar.google.com/citations?user=JNp4WR4AAAAJ>

Awards, fellowships:

- 2022: Dubrovin Medal
- 2015–2018: Young Russian mathematics fellowship
- 2011: Diploma for the oral presentation at the International Conference of Young Scientists (Kyiv, 21–23 DEC 2011)
- 2008: 2nd International Olympiad on Astronomy and Astrophysics (Bandung, Indonesia), bronze medal
- 2008: 39th International Physics Olympiad (Hanoi, Vietnam), bronze medal

Employment:

- 1 February 2023–now, SISSA (Scuola Internazionale Superiore di Studi Avanzati, Trieste, Italy), Mathematics Area, researcher (RTDa)
- June 2022–31 January 2023, Section de Mathématiques, Université de Genève, visiting assistant professor
- March–April 2022, Max Planck Institute for Mathematics, Bonn, Germany, visiting researcher

- I left Russia on 3 March 2022 due to the full-scale Russian invasion of Ukraine and terminated all formal relations with Russian organizations.
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- 2020–4 July 2022, HSE – Skoltech International Laboratory of Representation Theory and Mathematical Physics, research fellow
- 2019–31 October 2022 (on leave after 3 March 2022), Center for Advanced Studies, Skolkovo Institute of Science and Technology, assistant professor (5 years contract with possible extension)
- 2018–2019, Center for Advanced Studies, Skolkovo Institute of Science and Technology, research scientist
- 2014–2019, NRU HSE, Laboratory of Representation Theory and Mathematical Physics, junior research scientist

Grants:

- 2019–2021, Russian Science Foundation grant No. 19-11-00275
- 2018–2020, Russian Foundation for Basic Research grant No. 18-31-20062
- 2016–2019, Russian Science Foundation grant No. 16-11-10160
- 2015–2017, CNRS/PICS project “Isomonodromic deformations and conformal field theory” (F14-2015, F14-2016)
- 2014–2015, Ukrainian-Russian (NASU-RFBR) project 01-01-14

Papers:

1. Pavlo Gavrylenko, Evgenii Ievlev, Andrei Marshakov, Ilya Monastyrskii, Alexei Yung, *2d Sigma Models on Non-compact Calabi-Yau and $N=2$ Liouville Theory*, <https://arxiv.org/abs/2307.02929>
2. Pavlo Gavrylenko, Alba Grassi, Qianyu Hao, *Connecting topological strings and spectral theory via non-autonomous Toda equations*, <https://arxiv.org/abs/2304.11027>
3. Fabrizio Del Monte, Harini Desiraju, Pavlo Gavrylenko, *Monodromy dependence and symplectic geometry of isomonodromic tau functions on the torus*, <https://arxiv.org/abs/2211.01139>
4. Mikhail Bershtein, Pavlo Gavrylenko, Alba Grassi, *Quantum spectral problems and isomonodromic deformations*, Commun. Math. Phys. 393, 347–418 (2022), arXiv:2105.00985 [math-ph]
5. Fabrizio Del Monte, Harini Desiraju, Pavlo Gavrylenko, *Isomonodromic tau functions on a torus as Fredholm determinants, and charged partitions*, arXiv:2011.06292 [math-ph]
6. Pavlo Gavrylenko, Mykola Semenyakin, Yegor Zenkevich, *Solution of tetrahedron equation and cluster algebras*, J. High Energ. Phys. 2021, 103 (2021), arXiv:2010.15871 [inlin.SI]
7. Pavlo Gavrylenko, Andrei Marshakov, Artem Stoyan, *Irregular conformal blocks, Painlevé III and the blow-up equations*, J. High Energ. Phys. 2020, 125 (2020), arXiv:2006.15652 [math-ph]
8. Giulio Bonelli, Fabrizio Del Monte, Pavlo Gavrylenko, Alessandro Tanzini, *Circular quiver gauge theories, isomonodromic deformations and W_N fermions on the torus*, Lett Math Phys 111, 83 (2021), arXiv:1909.07990 [hep-th]

9. Giulio Bonelli, Fabrizio Del Monte, Pavlo Gavrylenko and Alessandro Tanzini, $\mathcal{N} = 2^*$ gauge theory, free fermions on the torus and Painlevé VI, Commun. Math. Phys. 377, 1381–1419 (2020), arXiv:1901.10497 [hep-th]
10. Pavlo Gavrylenko, Raoul Santachiara, Crossing invariant correlation functions at $c = 1$ from isomonodromic τ functions, J. High Energ. Phys. 2019, 119 (2019), [https://doi.org/10.1007/JHEP11\(2019\)119](https://doi.org/10.1007/JHEP11(2019)119), arXiv:1812.10362 [math-ph]
11. P. Gavrylenko, N. Iorgov, O. Lisovyy, On solutions of the Fuji-Suzuki-Tsuda system, SIGMA 14 (2018), 123, <https://doi.org/10.3842/SIGMA.2018.123>, arXiv:1806.08650 [math-ph]
12. M. Bershtein, P. Gavrylenko, A. Marshakov, Cluster Toda chains and Nekrasov functions, Theor Math Phys 198, 157–188 (2019), <https://doi.org/10.1134/S0040577919020016>, arXiv:1804.10145 [math-ph]
13. P. Gavrylenko, N. Iorgov, O. Lisovyy, Higher rank isomonodromic deformations and W -algebras, Lett Math Phys 110, 327–364 (2020), <https://doi.org/10.1007/s11005-019-01207-6>, arXiv:1801.09608 [math-ph]
14. M. Cafasso, P. Gavrylenko, O. Lisovyy, Tau functions as Widom constants, Commun. Math. Phys. (2018). <https://doi.org/10.1007/s00220-018-3230-9>, arXiv:1712.08546 [math-ph]
15. M. Bershtein, P. Gavrylenko, A. Marshakov, Cluster integrable systems, q -Painleve equations and their quantization, JHEP 1802:077, 2018, arXiv:1711.02063 [math-ph]
16. P. Gavrylenko, O. Lisovyy, Pure $SU(2)$ gauge theory partition function and generalized Bessel kernel, in String-Math 2016, Proceedings of Symposia in Pure Mathematics, vol. 98, Amer. Math. Soc., Providence, RI, 2018, pp. 181-205., <http://dx.doi.org/10.1090/pspum/098/01727>, arXiv:1705.01869 [math-ph]
17. M. Bershtein, P. Gavrylenko, A. Marshakov, Twist-field representations of W -algebras, exact conformal blocks and character identities, J. High Energ. Phys. (2018) 2018: 108., [https://doi.org/10.1007/JHEP08\(2018\)108](https://doi.org/10.1007/JHEP08(2018)108), arXiv:1705.00957 [hep-th]
18. P. Gavrylenko, O. Lisovyy, Fredholm determinant and Nekrasov sum representations of isomonodromic tau functions, Commun. Math. Phys. (2018) 363: 1. <https://doi.org/10.1007/s00220-018-3224-7>, arXiv:1608.00958 [math-ph]
19. P. Gavrylenko, A. Marshakov, Free fermions, W -algebras and isomonodromic deformations, Theor. Math. Phys. 2016, 187:2, 649–677, arXiv:1605.04554 [hep-th]
20. P. Gavrylenko, A. Marshakov, Exact conformal blocks for the W -algebras, twist fields and isomonodromic deformations, JHEP02(2016)181, arXiv:1507.08794 [hep-th]
21. P. Gavrylenko, Isomonodromic τ -functions and W_N conformal blocks, JHEP09(2015)167, arXiv:1505.00259 [hep-th]
22. P. Gavrylenko, A. Marshakov, Residue Formulas for Prepotentials, Instanton Expansions and Conformal Blocks, JHEP05(2014)097, arXiv:1312.6382 [hep-th]
23. P. Gavrylenko, N. Iorgov, O. Lisovyy, Form factors of twist fields in the lattice Dirac theory, J. Phys. A: Math. Theor. 45 (2012) 025402, arXiv:1108.3290 [hep-th]
24. Gavrylenko P.G., Zadorozhna L.V., Nonrelativistic Case of Gravitational Lensing by Simple Cosmic String Loops, Ukr. J. Phys. 2009, Vol. 54, N 3, p.319-324, http://archive.ujp.bitp.kiev.ua/files/journals/54/3/54_03_14.pdf

Talks:

1. *Isomonodromic tau functions on a torus, Fredholm determinants, and Nekrasov partition functions*, Kick-off meeting of CA21109 COST Action CaLISTA, Bologna, 5-8 June 2023, <https://eventi.unibo.it/kom-calista2023/speakers>
2. *Cluster structure of (non-autonomous) relativistic Toda chains described by K-matrices*, XII Workshop on Geometric Correspondences of Gauge Theories, ICTP, Trieste, Jul 4-7, 2022, <https://indico.sissa.it/event/80/>
3. *Kyiv formula, its generalizations and applications*, PIICQ workshop "Instructions in Integrability", SISSA, Trieste, May 23-27, 2022, <https://indico.sissa.it/event/56/>
4. *$N=2^*$ gauge theory, Fredholm determinants, and Riemann-Hilbert problem on a torus*, XI Workshop on Geometric Correspondences of Gauge Theories, (Zoom, SISSA – Trieste, September 20-24, 2021), <https://www.sissa.it/tpp/ws21/speakers.html>, <https://www.igap-ts.it/2021/08/24/xi-workshop-on-geome>
5. *Quantum Painlevé III₃, blow-up equations, and conformal blocks at infinity*, X Workshop on Geometric Correspondences of Gauge Theories, (Zoom, 14-18 September, 2020)
6. *Deautonomization of cluster integrable systems*, Integrability Combinatorics And Representations, (Giens, France, September 5, 2019), <http://www.lpthe.jussieu.fr/~pzinn/ICR/>
7. *Simplest example of isomonodromic deformations on torus and toric conformal blocks*, Workshop on Classical and Quantum Integrable Systems, (Euler Institute, Saint-Petersburg, July 22-26, 2019), <https://sites.google.com/view/cqis2019/programme>
8. *Isomonodromic deformations on torus, toric conformal blocks and gauge theories*, IX Workshop on Geometric Correspondences of Gauge Theories, (SISSA, Trieste, Italy, June, 17-21 2019), <https://people.sissa.it/~bonelli/workshops/ws19/index.html>
9. *Deautonomization of cluster integrable systems (Poster)*, Cluster Algebras 2019 (CA19), Week 1. School on cluster algebras: theory and applications (Kyoto, June 3-7, 2019), <https://sites.google.com/view/clusteralg19/week-1?authuser=0>
10. *Introduction to Fredholm determinant representation of isomonodromic tau functions I, II*, Geometry and Physics seminar (SISSA/IGAP, Trieste, Italy, January 29 - February 5, 2019), <https://www.math.sissa.it/seminar/introduction-fredholm-determinant-representation-isomonodromic-tau-functions-ii>
11. *Deautonomization of cluster integrable systems*, Symmetries and integrability of difference equations 13 (Fukuoka, Japan, November 11-17, 2018) <https://side13conference.net/program.html>
12. *Combinatorial expansion of the Fredholm determinant representation for isomonodromic tau function and conformal field theory* (video), Tau Functions of Integrable Systems and Their Applications (Banff, Canada, September 2-7, 2018), <https://www.birs.ca/events/2018/5-day-workshops/18w5025/>
13. *Crossing invariance of Liouville correlation functions at $c = 1$ from Painlevé VI*, Workshop and School "Topological Field Theories, String theory and Matrix Models - 2018" (Moscow, August 20 - August 25, 2018), <http://wwwth.itep.ru/mathphys/conf/moscow-2018/>
14. *Isomonodromic deformations, conformal blocks and Fredholm determinants*, VIII Workshop on Geometric Correspondences of Gauge Theories (SISSA - Trieste, June, 11-15 2018), <https://people.sissa.it/~bonelli/workshops/ws18/programme.html>
15. *Deautonomization of cluster integrable systems, II* (video), 6th Workshop on Combinatorics of Moduli Spaces, Cluster Algebras, and Topological Recursion (Moscow, June 4-9, 2018), <https://crei.skoltech.ru/cas/calendar/conf180604/program/>

16. *Cluster varieties, integrable systems and q-Painleve equations III*, Topological Field Theories, String theory and Matrix Models (Moscow, 25-31 August 2017), <http://wwwth.itep.ru/mathphys/conf/moscow-2017/>
17. *General Painlevé VI tau-function as Fredholm determinant*, Integrable Models in Statistical Mechanics, Limit Shapes and Combinatorics, (St. Petersburg, 7-11 August 2017), <http://www.pdmi.ras.ru/EIMI/2017/IMSM/>
18. *Isomonodromic deformations, twist fields and character identities for W-algebras*, Classical and Quantum Integrable Systems (Dubna, 24-29 July 2017), <https://sites.google.com/view/cqis2017>
19. *Painleve functions, conformal blocks and combinatorics II*, 5th String Theory Meeting in the Greater Tokyo Area, (Tokyo, 28 November 2016 - 02 December 2016), <http://indico.ipmu.jp/indico/conferenceDisplay.py?ovw=True&confId=99>
20. *Free-fermions, W-algebras, and higher-rank isomonodromic deformations*, Conformal Field Theory, Isomonodromic tau-functions and Painlevé equations, (Kobe, Japan, 21-25 November, 2016), <https://sites.google.com/site/1611kobe/>
21. *Determinantal formula for the general isomonodromic tau-function.*, Random Geometry and Physics (Paris, 17-21 October 2016), <http://www.th.u-psud.fr/RGP16/>
22. *Nekrasov functions at $\epsilon_1 + \epsilon_2 = 0$ from the Riemann-Hilbert problem*, Classical and quantum integrable systems and supersymmetry (CQISS-2016, Tianjin, 19-24 September 2016), <http://theor.jinr.ru/~cqiss/>
23. *General vertex operator of the W-algebra*, Russian-Japanese conference, (Moscow, Russia, 22-28 August 2016), <http://wwwth.itep.ru/mathphys/conf/moscow-2016/>
24. *Free fields, W-algebras and isomonodromic deformations*, Workshop on Classical and Quantum Integrable Systems (CQIS-2016, Saint-Petersburg, 11-15 July 2016), <http://www.pdmi.ras.ru/EIMI/2016/CQIS/>
25. *Isomonodromic deformations and vertex operators*, Seminar of mathematical physics (IPhT, CEA, Saclay, 02 June 2016), http://ipht.cea.fr/Phoce/Vie_des_labos/Seminaires/index.php?id=993137
26. *Fredholm determinant representations for isomonodromic tau functions II*, Seminar of mathematical physics and algebraic topology (Angers, France, 27 May 2016), <http://recherche.math.univ-angers.fr/spip.php?article29&site=56&session=15>
27. *Isomonodromic deformations and vertex operators*, Seminar “Geometry and Mathematical Physics” (Amsterdam, 17 May 2016)
28. *Exact conformal blocks for the W-algebras and Riemann surfaces*, International workshop “Monodromy preserving deformations and conformal field theory” (Tours, France, 28 SEP - 01 OCT 2015), <http://www.fdpoisson.fr/?q=agenda/index&type=64&evenement=2190>
29. *Exact conformal blocks for the W-algebras*, Seminar “Integrable Structures in Statistical and Field Models” (Moscow, 3 September 2015), <http://iitp.ru/en/science/seminars/1016.htm>
30. *Exact conformal blocks for the W-algebras*, Quantum Geometry, Duality and Matrix Models (Moscow, 24-30 AUG 2015), <http://wwwth.itep.ru/mathphys/conf/moscow-2015/>
31. *Isomonodromic τ -functions and W_N conformal blocks*, Workshop on Classical and Quantum Integrable Systems (CQIS-2015, Protvino, Russia, 6-10 JUL 2015), <https://sites.google.com/site/cqis2015/home>
32. *Isomonodromic τ -functions and W_N conformal blocks*, Workshop on mathematical physics (Amsterdam, May 26-28, 2015), <https://staff.fnwi.uva.nl/s.shadrin/workshopmathphysics.html>

33. *Residue formulas for prepotentials, instanton expansions and conformal blocks*, International Conference of Young Scientists (Kyiv, DEC 2014)
34. *Residue Formulas for Prepotentials, Instanton Expansions and Conformal Blocks*, Seminar “Integrable Structures in Statistical and Field Models” (Moscow, 5 June 2014), <http://iitp.ru/en/science/seminars/1208.htm>
35. *Tau-Function of sl_3 Isomonodromic Deformations and W_3 Conformal Blocks*, Seminar “Integrable Structures in Statistical and Field Models” (Moscow, 4 April 2014), <http://iitp.ru/en/science/seminars/1208.htm>
36. *Residue formulas for prepotentials, instanton expansions and conformal blocks*, Progress in synthesis of integrabilities arising from gauge-string duality (Osaka, 3-7 MAR 2014)
37. *Tau-functions of quiver gauge theories*, Synthesis of integrabilities in the context of duality between the string theory and gauge theories (Moscow, 9-13 SEP 2013) <https://math.hse.ru/data/2013/09/12/1275295022/schedule-4.pdf>
38. *Form factors of twist fields in the lattice Dirac theory*, International Conference of Young Scientists (Kyiv, 21-23 DEC 2011) <http://confyoung.bitp.kiev.ua/cy11/eng/homes/index.html>

Teaching:

1. 2023, Advanced Mathematical Physics 1 (University of Trieste, Italy)
2. 2023, 2D CFT (Introduction to two-dimensional conformal field theory and infinite-dimensional algebras), SISSA, Trieste, Italy
3. 2023, Introduction to statistical mechanics (KAU, Kyiv, Ukraine, on Zoom)
4. 2022, Renormalization group (KAU, Kyiv, Ukraine, on Zoom)
5. 2016–2022, organization of the students’ research seminars on mathematical physics (HSE/Skoltech, Moscow, Russia)
6. 2021, Quantum mechanics course, joint with Vladimir Losyakov (HSE/Skoltech, Moscow, Russia)
7. 2015, 2016, Strings and 2D CFT, joint with M. Bershtein and A. Marshakov (HSE, Moscow, Russia)

Conference organization:

1. *XIII Workshop on Geometric Correspondences of Gauge Theories*, SISSA, Trieste, 26–30 June 2023, <https://indico.sissa.it/event/98/>
2. *Isomonodromic Deformations, Painlevé equations, and Integrable Systems (IDPES-2022) conference*, Columbia University (online), 27 June 27–1 July 2022, <https://www.math.columbia.edu/~idpeis22/index.html>

Summer/winter school lectures and organization:

1. *Ising model II: CFT, integrable deformations, Painlevé equation*, Spring Student School on Mathematics and Physics, (Dubna, April 30-May 8, 2019), <https://crei.skoltech.ru/cas/calendar/conf190430/>
2. *Conformal field theory*, Pre-CQIS (Protvino, 25-30 June 2018), <https://crei.skoltech.ru/cas/ru/calendar-ru/conf180625ru/>
3. *Matrix models and integrable systems*, KAU matrix models 2017 (Kyiv, 14-19 August 2017), <https://sites.google.com/view/kaumm2017>

4. *Free fermions, determinants and isomonodromic deformations*, II School on string theories, integrable models and representation theory (Moscow, 21-27 January 2017), https://mf.hse.ru/school_2017
5. *Organizer. Lectures on SUSY QM*, Integrable equations in quantum mechanics and isomonodromic deformations (Moscow, 2-5 December 2015), <https://math.hse.ru/announcements/164828070.html>
6. *Lectures on Conformal Field Theory*, XIII School on mathematical physics for pupil, students, and post-graduates (Dubna, 1-10 May 2014), <http://sevastopol.bogomolov-lab.ru/>
7. *Introduction to 2D CFTs*, Integrability in the modern quantum field theory (Moscow, 3-8 FEB 2014), <http://sec.bitp.kiev.ua/uk/seminars/cons/2014-02-hse-integrability>
8. *One-loop effective action in Seiberg-Witten theory*, Integrable structures in quantum field theory (Dubna, 8-12 APR, 2013), <http://iitp.ru/ru/about/1073.htm>

Summer school participation:

1. Research meeting “Infinite dimensional algebras, geometry and integrable systems” (Kyoto, 1-5 November 2018), https://mf.hse.ru/kyoto_infindimsalggeom
2. Representation Theory and Integrable Systems (Amsterdam, 15-24 May 2017), <http://crei.skoltech.ru/cas/calendar/past-events/conf170515/>
3. Mathematica Summer School on Theoretical Physics “Random Matrix Theory and applications” (Berlin, 15-19 August 2016), <http://msstp.org/?q=node/302>
4. Les Houches School of Physics “Integrability: from statistical systems to gauge theory” (Les Houches, France, 7 June - 1 July 2016), <http://leshouches.strongcoupling.org/>
5. School-conference on string theory, integrable models, and representation theory (28 January - 3 February 2016), https://mf.hse.ru/school_2016
6. Integrable structures in quantum field theory (Dubna, 26 February - 03 March 2015)
7. Nordita School on Integrability (Stockholm, 04-12 August 2014)
8. Integrability and Isomonodromy in Mathematical Physics (Leiden, 7 - 11 July 2014)
9. 52th School on Subnuclear Physics (Erice, 24 June - 3 July 2014)
10. Algebra and Geometry (Yaroslavl, Russia, 25-31 JUL 2013)
11. XII School on mathematical physics for pupil, students, and post-graduates (Sevastopol, 30 APR - 10 MAY 2013)
12. School on the knot theory (Moscow, JUL, 2012)
13. Modern development of conformal field theory (Dubna 23-26 April 2012), <http://sec.bitp.kiev.ua/uk/seminars/bogolyubov-prog/2012/april-dubna>
14. Mathematica Summer School (Waterloo, Canada, 31 JUL - 6 AUG 2011)
15. IX International school on mathematical physics (Sevastopol, 30 APR - 10 MAY 2010)
16. IIX International school on mathematical physics (Kyiv, 30 APR - 10 MAY 2009)

Conference participation:

1. Supersymmetric Quantum Field Theories in the Non-perturbative Regime (Florence, May, 07-11, 2018), <https://www.ggi.infn.it/showevent.pl?id=273>
2. Recent Advances in Quantum Integrable Systems (Geneva, 22-26 August 2016), <https://lapth.cnrs.fr/conferences/RAQIS/RAQIS16/>
3. Geometric Invariants and Quantum Spectral Curves (Leiden, 1-5 June 2015), <https://www.lorentzcenter.nl/lc/web/2015/712/info.php?wsid=712&venue=0ort>
4. 4th Workshop on Combinatorics of Moduli Spaces, Cluster Algebras, and Topological Recursion (Moscow, 26-31 May 2015)