

CURRICULUM VITAE – ILYA B. SHAPIROVSKY

PERSONAL INFORMATION

Ilya B. Shapirovsky
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Department of Mathematical Sciences
New Mexico State University
Las Cruces, NM, USA, 88003-0001

JOB AND EDUCATION

Since 2020

New Mexico State University, NM, USA.
Current position: assistant professor.

Since 2007

Institute for Information Transmission Problems of the Russian Academy of Sciences. Moscow, Russia.
Current position: senior researcher (on unpaid leave since 2019).

2017–2020

Steklov Mathematical Institute of the Russian Academy of Sciences. Moscow, Russia.
Position: senior researcher.

2007

PhD in Mathematics (Russian degree of Candidate of Physical and Mathematical Sciences), specialities: “Algebra, Logic, and Number Theory” and “Theoretical Foundations of Computer Science”. Defended at Institute for Information Transmission Problems of the Russian Academy of Sciences. Thesis advisor: professor V. B. Shehtman.

2003

MSc in Mathematics and Applied Mathematics (Russian “Specialist degree”), Moscow State University, Faculty of Mechanics and Mathematics.

RESEARCH INTERESTS

Mathematical logic and theoretical computer science, with the emphasis to:

- Modal and temporal logic
- Computational complexity
- Spatial-temporal reasoning
- Combining formal systems
- Decidable theories of geometric structures

RESEARCH GRANTS

1. *Research Training Group in Logic and its Application*
NSF 2231414; 2023–2028; coPI
2. *Algorithmic problems in algebra and logic*
RSF 16-11-10252; 2016-2020; CoPI in 2019-2020

3. *Model-theoretic and algorithmic problems of modal and algebraic logics*
RFBR 16-01-00615; 2016–2018
4. *Investigation of models of non-classical logics*
RFBR–CNRS 14-01-93105; 2014–2015; PI
5. *Modal logics of topological spaces*
RFBR 14-01-31442; 2014–2015
6. *Model-theoretic and algorithmic properties of non-classical logics*
RFBR–CNRS 11-01-93107; 2011–2013
7. *Combined modal logics as an instrument for representing spatial information*
Russian–Israeli Scientific Research Cooperation, Project No. 206891; 2011–2012
8. *Decidable fragments of modal and algebraic logics*
RFBR 11-01-00958; 2011–2013
9. *Fundamental problems of algebraic geometry and mathematical logic and applications to information transmission theory*
RFBR 09-01-12170; 2009–2010
10. *Geometrical modal logics*
RFBR–CNRS 06-01-72555; 2006–2009
11. *Applied proof theory*
RFBR–CNRS 06-01-72554; 2006–2009
12. *Logical models of human and mechanical reasoning*
Netherlands Organisation for Scientific Research 047.017.014; 2006–2008
13. *Spatial modal logics*
RFBR–CNRS 02-01-22003; 2002–2005

REFEREED
PAPERS

1. Ilya B. Shapirovsky. Sufficient conditions for local tabularity of a polymodal logic. Accepted to Journal of Symbolic Logic. <https://arxiv.org/pdf/2212.07213.pdf>.
2. Ilya Shapirovsky. Decidability of modal logics of non- k -colorable graphs. In Helle Hvid Hansen, Andre Scedrov, and Ruy J.G.B. de Queiroz, editors, *Logic, Language, Information, and Computation*, pages 351–361, Cham, 2023. Springer Nature Switzerland.
3. Daniel Rogozin and Ilya Shapirovsky. On decidable extensions of Propositional Dynamic Logic with converse. *Journal of Applied Logics – IfCoLog Journal*, 10(4):629–642, 2023.
4. Denis I. Saveliev and Ilya Shapirovsky. Medvedev’s logic and products of converse well orders. In *Advances in Modal Logic*, volume 14, pages 681–696. College Publications, 2022. ISBN 978-1-84890-413-2.
5. Ilya Shapirovsky. Satisfiability problems on sums of Kripke frames. *ACM Trans. Comput. Logic*, 23(3), apr 2022. 25 pages. <https://doi.org/10.1145/3508068>.
6. I.B. Shapirovsky. Glivenko’s theorem, finite height, and local tabularity. *Journal of Applied Logics – IfCoLog Journal*, 8(8):2333–2347, 2021.
7. Denis I. Saveliev and Ilya B. Shapirovsky. On modal logics of model-theoretic relations. *Studia Logica*, 108(5):989–1017, Oct 2020.

8. S. Kikot, I. Shapirovsky, and E. Zolin. Modal logics with transitive closure: completeness, decidability, filtration. In *Advances in Modal Logic*, volume 13, pages 369–388, 2020. ISBN 978-1-84890-341-8.
9. I.B. Shapirovsky. Modal logics of finite direct powers of ω have the finite model property. In *Logic, Language, Information, and Computation, 29th International Workshop, WoLLIC 2019*, Lecture Notes in Computer Science, 2019.
10. I.B. Shapirovsky. Truth-preserving operations on sums of Kripke frames. In *Advances in Modal Logic*, volume 12, pages 541–558. College Publications, 2018. ISBN 978-1848902558.
11. I.B. Shapirovsky and V.B. Shehtman. Contemporary modal logic: between mathematics and computer science. In D.V. Zaitsev, editor, *Contemporary logic: foundations, subject, and perspectives*, pages 265–305. Forum, 2018. In Russian.
12. A.V. Kudinov and I.B. Shapirovsky. On partitioning Kripke frames of finite depth. *Izvestiya: Mathematics*, 81(3):134–159, 2017.
13. I. Shapirovsky and V. Shehtman. Local tabularity without transitivity. In *Advances in Modal Logic*, volume 11, pages 520–534. College Publications, 2016. ISBN 978-1-84890-201-5.
14. A.V. Kudinov and I.B. Shapirovsky. Finite model property of modal logics of finite depth. *Russian Mathematical Surveys*, 71(1):164–166, 2016.
15. D. Gabbay, I. Shapirovsky, and V. Shehtman. Products of modal logics and tensor products of modal algebras. *Journal of Applied Logic*, 12(4):570–583, 2014.
16. S. Kikot, I. Shapirovsky, and E. Zolin. Filtration safe operations on frames. In *Advances in Modal Logic*, volume 10, pages 333–352, 2014. ISBN 978-1-84890-151-3.
17. A. Kudinov, I. Shapirovsky, and V. Shehtman. On modal logics of Hamming spaces. In *Advances in Modal Logic*, volume 9, pages 395–410, London, 2012. College Publications. ISBN 978-1-84890-068-4.
18. I. Shapirovsky. Simulation of two dimensions in unimodal logics. In *Advances in Modal Logic*, volume 8, pages 371–392, London, 2010. College Publications. ISBN 978-1-84890-013-4.
19. I. Shapirovsky. PSPACE-decidability of Japaridze’s polymodal logic. In *Advances in Modal Logic*, volume 7, pages 289–304, London, 2008. College Publications. ISBN 978-1-904987-68-0.
20. I. Shapirovsky. On modal logics of some geometrical structures. *Problems of Information Transmission*, 43(3):255–262, 2007.
21. I. Shapirovsky. Modal logics of closed domains on Minkowski plane. *Journal of Applied Non-Classical Logics*, 17(3):283–316, 2007.
22. I. Shapirovsky. Downward-directed transitive frames with universal relations. In *Advances in Modal Logic*, volume 6, pages 413–428. College Publications, 2006. ISBN 978-1-904987-20-8.
23. Ph. Balbiani, I. Shapirovsky, and V. Shehtman. Every world can see a Sahlqvist world. In *Advances in Modal Logic*, volume 6, pages 69–85. College Publications, 2006. ISBN 978-1-904987-20-8.

24. I. Shapirovsky and V. Shehtman. Modal logics of regions and Minkowski spacetime. *Journal of Logic and Computation*, 15:559–574, 2005.
25. I. Shapirovsky. On PSPACE-decidability in transitive modal logic. In *Advances in Modal Logic*, volume 5, pages 269–287, London, 2005. College Publications. ISBN 1904987222.
26. I. Shapirovsky and V. Shehtman. Chronological future modality in Minkowski spacetime. In *Advances in Modal Logic*, volume 4, pages 437–459, London, 2003. College Publications. ISBN 0-9542006-1-0.

RESEARCH IN
PROGRESS

1. *Locally finite polymodal logics.*
2. *Colorability of graphs in modal languages.*

COLLOQUIA
(SINCE 2017)

- May 2021 *On the finite model property and computational complexity in sums of Kripke frames*
Steklov Mathematical Institute, Seminars “Proof Theory” and “Logic Online Seminar”, Moscow, Online
- April 2021 *Decidability and Computational Complexity in Modal Logic*
New Mexico State University, Las Cruces, New Mexico, United States
- February 2020 *Completeness and decidability in modal logic*
New Mexico State University, Las Cruces, New Mexico, United States
- July 2019 *Locally finite modal algebras and filtrations of Kripke models*
Steklov Mathematical Institute, Moscow, Russia
- October 2018 *Modal logics of model-theoretic relations*
The Fields Institute, Toronto, Canada
- September 2018 *Glivenko’s theorem, finite height, and local finiteness*
Steklov Mathematical Institute, Moscow, Russia
- June 2018 *Locally finite varieties of modal algebras*
The Fields Institute, Toronto, Canada
- July 2017 *Modal logics of finite direct powers $(\omega, \leq)^n$*
Steklov Mathematical Institute, Moscow, Russia
- January 2017 *Locally tabular modal logics*
Waterloo University, Waterloo, Canada

CONFERENCE
TALKS

- Decidability of modal logics of non-k-colorable graphs*
WoLLIC (Workshop on Logic, Language, Information and Computation) at Dalhousie University in Halifax, Nova Scotia, Canada, July 11–14, 2023
- Locally finite polymodal logics and Segerberg – Maksimova criterion*
Logic Colloquium 2023 (European Summer Meeting of the Association for Symbolic Logic) at University of Milan, Italy, June 5–9, 2023.
- Sufficient conditions for local finiteness of a polymodal logic*
AMS Special Session on Algebraic Structures in Topology, Logic, and Arithmetic, UTEP, El Paso, Texas, USA, September 17, 2022.

- Medvedev's logic and products of converse well orders*
Advances in Modal Logic 2022, Rennes, France, August 22-25. Joint work with D. I. Saveliev.
- Sums of Kripke frames and locally finite modal logics*
Topology, Algebra, and Categories in Logic 2022, University of Coimbra, Portugal, June 20-24, 2022.
- Applications of filtrations: PDLization and local finiteness*
DOCToR: Duality, Order, (Co)algebras, Topology, and Related topics, Online, July 7-9, 2021.
- Modal decision problems on sums of Kripke frames* (invited talk)
Fifth Workshop on Proof Theory, Modal Logic and Reflection Principles, Universitat de Barcelona, Spain, November 5-8, 2019
- Satisfiability problems on sums of Kripke frames*
Logic Colloquium 2019, European Summer Meeting of the Association for Symbolic Logic, Prague, Czech Republic, August 11-16, 2019
- Modal logics of finite direct powers of ω have the finite model property*
26th Workshop on Logic, Language, Information and Computation (WoLLIC 2019), Utrecht University, The Netherlands, July 2 - 5, 2019
- Glivenko's theorem, finite height, and local finiteness*
Topology, Algebra, and Categories in Logic 2019, Université Côte d'Azur, Nice, June 17 - 21, 2019
- Truth-preserving operations on sums of Kripke frames*
Advances in Modal Logic (AiML-2018), University of Bern, August 27-31, 2018
- The one-variable fragment of a non-locally tabular modal logic can be finite* (invited talk)
International Workshop on Topological Methods in Logic (TOLO-VI). Ilia State University, Tbilisi, Georgia, July 2-6, 2018.
- Local finiteness of modal algebras in terms of Kripke frames partitions*
BLAST conference series, 14-18 Aug 2017, Nashville, USA
- Analogues of Glivenko's translation for polymodal logics*
7th Workshop on Intuitionistic Modal Logic and Applications (IMLA 2017). 17 - 21 July, 2017, Toulouse, France.
- Locally tabular polymodal logics*
8th International Conference on Topology, Algebra, and Categories in Logic (TACL 2017). 26-30 June 2017, Prague, Czech Republic.
- Ordered sums, Horn properties, and provability logics* (invited talk)
Third International Workshop on Proof Theory, Modal Logic and Reflection Principles. 5 - 9 September 2016, Tbilisi, Georgia.
- Local tabularity without transitivity*
Advances in Modal Logic (AiML-2016). 30 August - 2 September 2016, Budapest, Hungary. Joint work with V. Shehtman.
- Local tabularity via filtrations* (invited talk)
International Workshop on Topological Methods in Logic (TOLO-V) 13-17 June 2016, Tbilisi, Georgia. Joint work with V. Shehtman.

- Axiomatizations of lexicographic sums and products of modal logics*
 7th International Conference on Topology, Algebra, and Categories in Logic (TACL 2015). 21 - 26 June 2015, Ischia Island, Italy. Joint work with Ph. Balbiani.
- On completeness of logics enriched with transitive closure modality*
 7th International Conference on Topology, Algebra, and Categories in Logic (TACL 2015). 21 - 26 June 2015, Ischia Island, Italy. Joint work with E. Zolin.
- Tensor products of logics containing S_4* (invited talk)
 International Workshop on Topological Methods in Logic (TOLO IV). 23 - 27 June 2014, Tbilisi, Georgia.
- Filtrations of chequered Kripke models*
 Information Technology and Systems (ITaS-2013). 1 - 7 September 2013, Kaliningrad, Russia.
- On modal logics of Hamming spaces*
 Advances in Modal Logic (AiML-2012). 22 - 25 August 2012, Technical University of Denmark, Copenhagen, Denmark. Joint work with A. Kudinov and V. Shehtman.
- Modal logics of Hamming spaces and products of Kripke frames* (invited talk)
 International Workshop on Topological Methods in Logic (TOLO-III). 23 - 27 July 2012, Razmadze Mathematical Institute, Tbilisi, Georgia. Joint work with A. Kudinov and V. Shehtman.
- PSPACE complexity of GLP and some other modal logics* (invited talk)
 Proof Theory and Modal Logic. 16 - 19 April 2012, Institut de Matematica de la Universitat de Barcelona, Spain.
- Finite model property of pretransitive analogs of S_5*
 Topology, Algebra, and Categories in Logic (TACL-2011). July 26 - 30 2011, Marseilles, France. Joint work with A. Kudinov.
- Simulation of two dimensions in unimodal logics*
 Advances in Modal Logic (AiML-2010). 24 - 27 August 2010, Steklov Mathematical Institute, Moscow, Russia.
- Finite approximability of generally-transitive symmetric modal logics*
 Information Technology and Systems (ITaS-2009). 15 - 18 December 2009, Bekasovo, Russia. Joint work with A. Kudinov.
- Modal logics of ordered sums of frames*
 Topology, Algebra, and Categories in Logic (TACL-2009). July 7-11 2009, Amsterdam, the Netherlands.
- Fusions of ordered sums of transitive Kripke frames*
 5th Moscow-Vienna Workshop series on Logic and Computation. June 29 - July 1 2009, Vienna University of Technology.
- Satisfiability on ordinal sums of transitive Kripke frames*
 Logical Models of Reasoning and Computation, II. November 25 - 26 2008, Utrecht University, the Netherlands.
- One semantical condition for PSPACE-decidability of modal logics*
 Information Technology and Systems (ITaS-2009). September 29 - October 3 2008, Gelendgik, Russia.

- PSPACE-decidability of Japaridze's Polymodal Logic*
Advances in Modal Logic (AiML-2008). 9 - 12 September 2008, Laboratoire Lorrain de Recherche en Informatique et ses Applications, Nancy, France.
- Decision procedures for modal logics via conditional satisfiability*
Logical Models of Reasoning and Computation (LMRC08). May 5 - 8 2008, Steklov Mathematical Institute, Moscow, Russia.
- Downward-directed transitive frames with universal relations*
Advances in Modal Logic (AiML-2006). 25 - 28 September 2006, The University of Queensland, Australia.
- RCC-relations and relativistic time*
Computer science applications of modal logic. 5 - 9 September 2005, Independent University of Moscow, Russia.
- On some transitive logics with the universal modality*
27th Conference Of Young Scientists. 11 - 23 April 2005, Moscow State University, Russia.
- PSPACE decision procedure for some transitive modal logics*
Advances in Modal Logic (AiML-2004). 9 - 11 September 2004, University of Manchester, UK.

TEACHING

Students supervision

- Supervision for Master's thesis
A. Zhuravlev "*Algorithm for checking modal satisfiability in ordered sums of Kripke frames*"
Faculty of Mechanics and Mathematics, Moscow State University. May 2014.
- Supervision for Master's thesis
A. Zapletin "*Finite approximability of some modal logics axiomatized by pseudotransitive and closed formulas*"
Faculty of Mechanics and Mathematics, Moscow State University. May 2014.

Modal Logic (Spring 2023) Department of Mathematical Sciences, New Mexico State University

Foundations of Geometry (Fall 2022) Department of Mathematical Sciences, New Mexico State University

Mathematical Structures in Logic (Spring 2022) Department of Mathematical Sciences, New Mexico State University

Logic and Set Theory (Fall 2021) Department of Mathematical Sciences, New Mexico State University

Great theorems: the art of mathematics (Spring 2021; Spring 2023) Department of Mathematical Sciences, New Mexico State University

Calculus I (Fall 2020, Fall 2021, Fall 2022) Department of Mathematical Sciences, New Mexico State University

Bisimulations and filtrations in modal logic An advanced one-week course at 31st European Summer School in Logic, Language and Information, August 5-9, 2019. With prof. V. Shehtman.

Models of non-classical logics (Fall 2015 – Spring 2016). A one-year special course for graduate students at the Faculty of Mechanics and Mathematics at Moscow State University. With Dr. E. Zolin.

Modal logic and its applications (Fall 2014 – Spring 2015). A one-year special course for graduate students at the Faculty of Mechanics and Mathematics at Moscow State University. With Dr. E. Zolin.

Introduction to modal logic (Fall 2013 – Spring 2014). A one-year special course for graduate students at the Faculty of Mechanics and Mathematics at Moscow State University.

Modal and algebraic logic (2012 – now). A regular seminar at the Faculty of Mechanics and Mathematics at Moscow State University. With prof. M. Pentus and prof. V. Shehtman.

Programme Committee

Advances in Modal Logic 2022
Advances in Modal Logic 2020
Advances in Modal Logic 2018
Topology, Algebra, and Categories in Logic 2017
Advances in Modal Logic 2016
Advances in Modal Logic 2014

PhD Dissertation Committee

New Mexico State University, Department of Mathematical Sciences.
Las Cruces, New Mexico, 2021.

Luca Carai. “*New directions in duality theory for modal logic*”

A dissertation submitted for the degree Doctor of Mathematics.

Moscow State University, Faculty of Mechanics and Mathematics.
Moscow, 2012.

Daniyar S. Shamkanov. “*Interpolation properties of provability logics and normalization for terms of reflexive combinatory logic*”

PhD in Mathematical Logic, Algebra and Number Theory (Candidate of Sciences)

Faculty of Mechanics and Mathematics, Moscow State University.
Moscow, 2012.

Evgeny V. Dashkov. “*On propositional calculus representing the notion of proof*”

PhD in Mathematical Logic, Algebra and Number Theory (Candidate of Sciences).

Refereeing

Journals

Algebra Universalis, Logic Journal of the IGPL, Journal of Symbolic Logic, Archive for Mathematical Logic, Journal of Logic and Computation, Russian Mathematical Surveys, Review of Symbolic Logic, Bulletin of Symbolic Logic, Journal of Philosophical Logic, Studia Logica, Problems of Information Transmission, Journal of Applied Non-Classical Logics, Annals of Mathematics and Artificial Intelligence, ACM Transactions on Computational Logic

Conferences

Advances in Modal Logic 2010, 2012, 2014, 2016, 2018, 2020, 2022; *Topology, Algebra, and Categories in Logic* 2017; *Logic in Computer Science* 2015, 2021; *Information Technologies and Systems* 2014, 2015; *Computer Science Logic* 2008, 2015; *Computer Science Symposium in Russia* 2011, *TABLEAUX* 2011; *Frontiers of Combining Systems* 2009, *Methods for Modalities* 2009.

Other refereeing

Assisting South Africa's National Research Foundation in evaluating the quality, impact and standing of a research portfolio

Reviewing for Fulbright Polish-U.S. Senior Award Program 2020/21

Refereeing for Moebius Contest 2018, 2019.

Organizing Committee

27th Joint NMSU/UTEP Workshop (New Mexico State University, Las Cruces, NM, USA, April 2th, 2022).

BLAST 2021 (New Mexico State University, Las Cruces, NM, USA, June 9 - 13, 2021, online). *BLAST* is a conference series focusing on **B**oolean Algebras, **L**attices, **A**lgebraic and **Q**uantum logic, **U**niversal **A**lgebra, **S**et Theory, **S**et-theoretic and **P**oint-free **T**opology. The series is based in the mountain/western/midwest region of the US. Due to COVID-19, *BLAST* 2021 was held online.

Advances in Modal Logic 2010 (Steklov Mathematical Institute, Moscow, Russia, August 24 - 27, 2010).

Computer science applications of modal logic 2005 (Independent University of Moscow, September 5-9, 2005).