Dr. Alexey I. STUKACHEV

Sobolev Institute of Mathematics
Department of Mathematical Logic
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Senior Researcher

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Research interests: computability theory (generalized computability, computability in admissible sets, HF-computability), model theory (computable structures, effectively presentable structures, degrees of presentability), mathematical linguistics

Date of birth: 1975, September 24

Family status: married, two children

Education: Novosibirsk State University

1992-1996: student, Department of Mathematics and Mechanics

1996: BA in Mathematics (diploma with honors)

2000: MA in Mathematics (diploma with honors)

2000-2002: postgraduate student (aspirant)

2002: Ph.D. in Mathematics, Ph.D. Thesis: *Computability in Admissible Sets*, advisor: acad. Yu.L. Ershov

2010-2013: doctorant

Awards and Prizes

1. I-st Prize for the Best Student Paper, XXXIV International Scientific Student Conference, Novosibirsk (1996)
2. Diploma of the Ministry of Education of the Russian Federation for the Best Student Paper (1997)
3. Medal of the Ministry of Education of the Russian Federation for the Best Student Paper (2001)
4. Prize of the "Algebra and Logic" Journal for the Best Paper (2004)

Personal Grants

1. Grant of the President of the Russian Fegeration for Young Scientists, project MK-1239.2005.1 "Computability in Admissible Sets", 2005-2006.
2. INTAS, project INTAS YSF 04-83-3310 "Computability in Admissible Sets", 2005-2007.
3. Russian Academy of Sciences, Siberian Branch, Lavrentjev Awards for Young Researchers, project 12 "Presentation of Structures in Admissible Sets", 2006-2007
4. RFBR, travel grant 05-01-10727 for participating in LC2005
5. RFBR, travel grant 06-01-10668 for participating in CiE2006
6. RFBR, travel grant 07-01-08150 for participation in CiE2007
7. RFBR, travel grant 10-01-09299-mob-z for participation in LC2010 and WCT2010
8. RFBR, travel grant 10-01-92877-ANF-z for participation in the joint Russian-Austrian seminar "Computability and Definability", 2010
9. Russian Academy of Sciences, Siberian Branch, Lavrentjev Awards for Young Researchers, project "Effective Aspects of Model Theory and Computability in Admissible Sets", 2010-2011
10. Vladimir Potanin Charitable Foundation, grant competition for master's professors, project GK22-000733 "Language Models in Mathematical and Computational Linguistics", 2022-2023

Plenary and Invited Talks

1. "Malcev Meetings 2004", Novosibirsk, Russia, November 16-18, 2004
2. "Malcev Meetings 2005", Novosibirsk, Russia, November 15-17, 2005
3. "Computability in Europe 2007: Computation and Logic in the Real World", Siena, Italy, June 18-23, 2007 (joint with Yu.L. Ershov and V.G. Puzarenko)
4. Workshop "Effective Mathematics of the Uncountable", New York, USA, August 18-22, 2008

5. "Continuity, Computability, Constructivity: from Logic to Algorithms", Cologne, Germany, July 14-18, 2009
6. "Malcev Meetings 2010", Novosibirsk, Russia, May 2-6, 2010
7. "Workshop on Computability Theory 2010", Paris, France, July 23-24, 2010
8. "Algebra and Mathematical Logic", Kazan', Russia, September 25-30, 2011
9. "Contemporary Problems of Algebra and Mathematical Logic", Kazan', Russia, September 22 – October 3, 2011
10. "Definability in Computable Models", Chicago, USA, May 2-6, 2012
11. "Malcev Meetings 2013", Novosibirsk, Russia, November 11-15, 2013
12. "Second Workshop on Digitalization and Computable Models (WDCM-2020)", Novosibirsk, Russia, virtual, July 20-24, 2020
13. "Logic and Algorithms in Computational Linguistics 2021", Montpellier, France, virtual, December 15-17, 2021
14. "Boundary Problems of Model Theory and Universal Algebra (Erlagol-2023)", Erlagol, Russia, virtual, June 21-28, 2023

Professional Experience

Sobolev Institute of Mathematics, Novosibirsk

2003 - present: Senior Researcher

2012 - present: Scientific Secretary of the Dissertation Council D 003.015.02

Novosibirsk State University

Teaching Positions

1. Higher College in Informatics: Chair of Mathematics, Assistant (1998 - 2002), Assistant Professor (2003 - 2004)
2. Higher School in Physics and Mathematics: Chair of Mathematics, Assistant Professor (2005), Associate Professor (2006 - 2007, 2016 - present)
3. Department of Intormatics: Chair of Mathematics, Assistant Professor (2004 - 2005), Associate Professor (2006 - 2009)
4. Department of Mathematics and Mechanics : Chair of Algebra and Mathematical Logic, Assistant (2003 - 2005); Chair of Discrete Mathematics and Informatics, Assistant Professor (2005 - 2006), Associate Professor (2006 - present)

Lecture Courses

1. Linear Algebra and Analytical Geometry, Department of Informatics, Applied Informatics, 2005 - 2009
2. Mathematical Logic and Theory of Algorithms, Department of Informatics, Applied Informatics, 2005 - 2009
3. Definability and Computability, Department of Mathematics and Mechanics, Chair of Discrete Mathematics and Informatics, 2006 - present

4. Elementary Mathematics, Specialized Educational Scientific Center, 2016 - present
5. Formal Languages and Automata, Department of Mathematics and Mechanics, 2017 - present
6. Mathematical Models of Languages, Humanities Department, 2017 - present
7. Mathematical Models of Languages, Department of Mathematics and Mechanics (master program), 2019 - present
8. Introduction to Mathematical and Computational Linguistics, Specialized Educational Scientific Center, 2020 - present

Seminar Courses

1. Mathematical Logic, Department of Mathematics and Mechanics, 2004 - present
2. Theory of Algorithms, Department of Mathematics and Mechanics, 2005 - present
3. Elementary Mathematics, Specialized Educational Scientific Center, 2005 - 2007
4. Linear Algebra and Analytical Geometry, Department of Informatics, Applied Informatics, 2005 - 2006
5. Mathematical Logic and Theory of Algorithms, Department of Informatics, Applied Informatics, 2005 - 2006

Organizing Conferences and Workshops

1. "Malcev Meetings", Novosibirsk, Russia, 2004, ... ,2011 (member of the Organizing Committee).
2. "9th Asian Logic Conference", Novosibirsk, Russia, August 16-19, 2005 (member of the Organizing Committee).
3. Workshop "Computable Models and Numberings", Novosibirsk, Russia, August 6-11, 2007 (member of the Organizing Committee).
4. Joint Workshop "Domains VIII and Computability over Continuous Data Types", Novosibirsk, Russia, September 5-11, 2007 (secretary).

List of Publications

Papers in Refereed Journals and Volumes

1. A.I. Stukachev, Uniformization property in heredidary finite superstructures, *Siberian Advances in Mathematics*, v. 7, N1 (1997), pp. 123-132.
2. A.I. Stukachev, Σ-admissible families over linear orders, *Algebra i Logika*, v. 41, N2 (2002), pp. 228-252 (Russian).
3. A.I. Stukachev, Σ-definability in hereditary finite superstructures and pairs of models, *Algebra i Logika*, v. 43, N4 (2004), pp. 459-481 (Russian).
4. A.I. Stukachev, On inner constructivizability of admissible sets, *Vestnik NGU*, v. 5, N1 (2005), pp. 69-76 (Russian).

5. Alexey Stukachev, Presentations of structures in admissible sets, *Lecture Notes in Computer Science*, v. 3526 (2005), pp. 470-478.

6. Alexey Stukachev, On mass problems of presentability, *Lecture Notes in Computer Science*, v. 3959 (2006), pp. 774-784.

7. A.I. Stukachev, Degrees of presentability of structures. I, *Algebra i Logika*, v. 46, N6 (2007), pp. 763-788 (Russian).

8. A.I. Stukachev, Degrees of presentability of structures. II, *Algebra i Logika*, v. 47, N1 (2008), pp. 108-126 (Russian).

9. A.I. Stukachev, A jump inversion theorem for the semilattices of Σ-degrees, *Siberian Electronic Mathematical Reports*, v. 6 (2009), pp. 182-190 (Russian).

10. A.I. Stukachev, A jump inversion theorem for the semilattices of Sigma-degrees of structures, *Siberian Advances in Mathematics*, v. 20, N1 (2010), pp. 68-74.

11. A.I. Stukachev, Σ-definability of uncountable models of c-simple theories, *Siberian Mathematical Journal*, v. 51, N3 (2010), pp. 649-661.

12. Yu.L. Ershov, V.G. Puzarenko, and A.I. Stukachev, HF-Computability, In S. B. Cooper and A. Sorbi (eds.): *Computability in Context: Computation and Logic in the Real World*, Imperial College Press/World Scientific (2011), pp. 173-248.

13. Alexey Stukachev, On Processes and Structures, *Lecture Notes in Computer Science*, v. 7921 (2013), pp. 393-402.

14. Alexey Stukachev, Effective Model Theory: an approach via Σ-Definability, *Lecture Notes in Logic*, v. 41 (2013), pp. 164-197.

15. A.I. Stukachev, On quasiregular structures with computable signatures, *Siberian Electronic Mathematical Reports*, v. 11 (2014), pp. 444-450 (Russian).

16. A.I. Stukachev, On properties of $s\Sigma$-reducibility, *Algebra i Logika*, v. 53, N5 (2014), pp. 625-642 (Russian).

17. A.I. Stukachev, Generalized hyperarithmetical computabilty on structures, *Algebra i Logika*, v. 55, N6 (2016), pp. 769-799 (Russian).

18. A.I. Stukachev, Processes and structures on approximation spaces, *Algebra i Logika*, v. 56, N1 (2017), pp. 93-109 (Russian).

19. Alexey Stukachev, Approximation spaces of temporal processes and effectiveness of interval semantics, *Advances in Intelligent Systems and Computing*, v. 1242 (2021), pp. 53-61.

20. A.I. Stukachev, Interval extensions of orders and temporal approximation spaces, *Siberian Mathematical Journal*, v. 62, N4 (2021), pp. 894-910 (Russian).

21. A.S. Burnistov, A.I. Stukachev, On inner constructivizability of functional structures, *Algebra i logica*, v. 61, N1 (2021), pp. 23-41.

22. Artem Burnistov and Alexey Stukachev, Generalized computable models and Montague semantics, *Studies in Computational Intelligence*, v. 1081 (2023), pp. 107-124.

23. Artem Burnistov and Alexey Stukachev, Computable functionals of finite types in Montague semantics, *Lecture Notes in Computer Science*, accepted for publication.

24. A.I. Stukachev, On c-simple theories, *Algebra i Logika* (submitted).

Translations of Papers

1 A.I. Stukachjov, Σ-admissible families over linear orders, *Algebra and Logic*, v. 41, N2 (2002), pp. 127-139.

2. A.I. Stukachov, Σ-definability in hereditary finite superstructures and pairs of models, *Algebra and Logic*, v. 43, N4 (2004), pp. 258-270.

3. A.I. Stukachev, Degrees of presentability of structures. I, *Algebra and Logic*, v. 46, N6 (2007), pp. 419-432.

4. A.I. Stukachev, Degrees of presentability of structures. II, *Algebra and Logic*, v. 47, N1 (2008), pp. 65-74.

5. A.I. Stukachev, Σ-definability of uncountable models of c-simple theories, *Siberian Mathematical Journal*, v. 51, N3 (2010), pp.515-524.

6. A.I. Stukachev, Properties of $s\Sigma$-reducibility, *Algebra and Logic*, v. 53, N5 (2014), pp. 405-417.

7. A.I. Stukachev, Generalized hyperarithmetical computability on structures, *Algebra and Logic*, v. 55, N6 (2016), pp. 452-470.

8. A.I. Stukachev, Processes and structures on approximation spaces, *Algebra and Logic*, v.56, N1 (2017), pp. 63-74.

9. A.I. Stukachev, Interval extensions of orders and temporal approximation spaces, *Siberian Mathematical Journal*, v. 62, N4 (2021), pp. 730-741.

10. A.S. Burnistov, A.I. Stukachev, On inner constructivizability of functional structures, *Algebra and Logic*, v. 61, N1 (2021), pp. 16-29.

Papers in Volumes and Periodical Editions

1. A.I. Stukachev, Uniformization property in heredidary finite superstructures, in 'Generalized Definability and Computability', *Vychislitel'nye Sistemy*, v. 161, Novosibirsk, IM SO RAN, 1998, pp. 3-14 (Russian).

2. A.I. Stukachev, Σ-admissible families in structures of kind HYP(M), Algebra and Model Theory 3, collection of papers, Novosibirsk, NGTU, 2001, pp. 126-130 (Russian).

3. A.I. Stukachev, Inner Σ-definability in hereditary finite superstructures, Algebra and Model Theory 4, collection of papers, Novosibirsk, NGTU, 2003, pp. 116 - 123 (Russian).

4. A.I. Stukachev, On structures decidable in admissible sets, Transactions of the Lobachevskij Mathematical Center, Kazan, Kazan Mathematical Society, 2004, v. 23, pp. 69-70 (Russian).

5. Alexey Stukachev, On inner constructivizability of admissible sets, in A. Beckmann, U. Berger, B. Lowe, and J.V. Tucker (eds.): Logical Approaches to Computational Barriers, University of Wales Swansea, Computer Science Report Series, pp. 261-267.

6. Alexey Stukachev, Effective reducibilities on structures and degrees of presentability, in S.B. Cooper, T.F. Kent, B. Lowe and A. Sorbi (eds.): Computation and Logic in the Real World, University of Siena, Italy, Technical report no. 478, pp. 332-339.

Publications in Conference Proceedings

1. A.I. Stukachev, Uniformization Theorem for HF(R), Proceedings of the XXXIV International Scientific Student Conference 'Student i Nauchno-Tehnicheskij Progress: Matematica', NGU, 1996, p. 83 (Russian).

2 A.I. Stukachev, On definability in admissible sets of kind HF(M), Proceedings of the 33d Regional Young Scientists Conference 'Fundamental Problems of Theoretical and Applied Mathematics', Ekaterinburg, 2002, pp. 47-50 (Russian).

3. A.I. Stukachev, On inner constructivizability of admissible sets, Proceedings of the International Conference 'Algebra, Logic and Cybernetics', Irkutsk, 2004, pp. 201-202 (Russian).

4. A.I. Stukachev, Presentations of structures in admissible sets, Proceedings of the 5th Conference of Young Scientists of the SB RAS, Novosibirsk, 2007, part I, pp. 34-36 (Russian).

Abstracts of Talks Published in Journals

1. Alexey Stukachev, Σ-definability in hereditary finite superstructures and pairs of models, *Bulletin of Symbolic Logic*, v. 10, N2 (2004), p.272-273.

2. Alexey Stukachev, On structures decidable in admissible sets, *Bulletin of Symbolic Logic*, v. 11, N2 (2005), p. 296.

3. Alexey Stukachev, Presentations of structures in admissible sets and on natural numbers, *Bulletin of Symbolic Logic*, v. 13, N2 (2007), p. 290.

4. Alexey Stukachev, On Ershov semilattices of degrees of Σ-definability of structures, *Bulletin of Symbolic Logic*, v.14, N1 (2008), p. 150.

5. Alexey Stukachev, Effective presentations of uncountable structures, *Bulletin of Symbolic Logic*, v. 17, N2 (2011), pp. 318-319.

6. Alexey Stukachev, Effective presentations of uncountable structures. II, *Bulletin of Symbolic Logic*, v. 18, N3 (2012), p. 465.

7. Alexey Stukachev, Dynamic logic on approximation spaces, *Bulletin of Symbolic Logic*, v.21, N1 (2015), p. 93.

8. Alexey Stukachev, Generalized computability and effective model theory in mathematical linguistics, In: Proceedings of the SymposiumLogic and Algorithms in Computational Linguistics 2021 (LACompLing2021). Ljungström, Axel, Loukanova, Roussanka, Lumsdaine, Peter LeFanu, Muskens, Reinhard (Editors). Publisher: Stockholm University, 2021, DiVA Portal for Digital Publications, p. 25.

Preprints and Autoreferats

1. A.I. Stukachev, On some properties of computability over structures, preprint N18, Novosibirsk, NGU, 2002 (Russian).

2. A.I. Stukachev, Computability in admissible sets, Ph.D Thesis autoreferat, Novosibirsk, NGU, 2002 (Russian).

Scientific Reports

Scientific report on the fundamental research 'Studies of computability in hereditary finite superstructures', Novosibirsk, NGU, 2005 (Russian).

Collective Grants

1. RFBR, project 02-01-00540-a 'Exact Semantics and their Applications', 2002-2004, coordinated by Yu.L. Ershov.

2. RFBR, project 05-01-00481-a 'Formal Definability in Algebra, Model Theory and Computability Theory', 2005-2007, coordinated by Yu.L. Ershov.

3. 'Universities of Russia', project UR.04.01.019, 2003-2004, coordinated by Yu.L. Ershov.

4. 'Universities of Russia', project UR.04.01.488 'Definability and Computability in Admissible Sets', 2005-2006, coordinated by Yu.L. Ershov.

5. Grant Council by the President of the Russian Federation for Support of Young Scientists and Leading Scientific Schools, project NSh-2069.2003.1, 2003-2005, coordinated by Yu.L. Ershov.

6. RFBR, project 06-01-04002-NNIOa 'Computations over Nondiscrete Structures: Models, Semantics and Complexity', 2006-2008, coordinated by Yu.L. Ershov.

7. RFBR, project 08-01-00442-a 'Effective Presentability of Mathematical Objects', 2008-2010, coordinated by Yu.L. Ershov.

8. Grant Council by the President of the Russian Federation for Support of Young Scientists and Leading Scientific Schools, project NSh-335.2008.1, 2008-2009, coordinated by S.S. Goncharov.

9. RFBR, project 09-01-12140-ofi-m 'Hyperarithmetical Structures', 2009-2010, coordinated by Yu.L. Ershov.

10. Grant Council by the President of the Russian Federation for Support of Young Scientists and Leading Scientific Schools, project NSh-3606.2010.1, 2010-2011, coordinated by S.S. Goncharov.

11. RFBR, project 11-01-00688-a "Natural Superstructures in Computability and Model Theory", 2011-2013, coordinated by Yu.L. Ershov.

12. Grant Council by the President of the Russian Federation for Support of Young Scientists and Leading Scientific Schools, project NSh-276.2012.1, 2012-2013, coordinated by S.S. Goncharov.

13. Ministry of Education and Science of Russian Federation, FCP project 8227, 2012-2013, coordinated by S.S. Goncharov.

14. RFBR, project 13-01-91001-ANF-a "Computability and Definability", 2013-2015, coordinated by S.S. Goncharov.

15. RFBR, project 18-01-00624-a 'Generalized Hyperarithmetical Computability', 2018-2020, coordinated by Yu.L. Ershov.

Contributed Talks

1. XXXIV International Scientific Student Conference, Novosibirsk, Russia, April 23-25, 1996.

2. International Summer School 'Intermediate Problems of Model Theory and Universal Algebra', Erlogol, Altai Mountains, Russia, June 25-29, 2001.

3. 33rd Regional Conference 'Fundamental Problems of Theoretical and Applied Mathematics', Ekaterinburg, Russia, January 29 - February 1, 2002.

4. International Summer School 'Intermediate Problems of Model Theory and Universal Algebra', Erlogol, Altai Mountains, Russia, June 26-30, 2003.

5. 'Logic Colloquium 2003', Helsinki, Finland, August 14-20, 2003.

6. International Conference 'Algebra and Analysis 2004', held on 200th anniversary of Kazan State University, Kazan, Russia, June 2-9, 2004.

7. 'Logic Colloquium 2004', Turin, Italy, July 25-30, 2004.

8. International Conference 'Algebra, Logic and Cybernetics', held on 75th anniversary of A.I. Kokorin, Irkutsk, Russia, August 25-28, 2004.

9. 'Computability in Europe 2005: New Computational Paradigms', Amsterdam, the Netherlands, June 8-12, 2005.

10. 'Logic Colloquium 2005', Athens, Greece, July 28 - August 3, 2005.

11. '9th Asian Logic Conference', Novosibirsk, Russia, August 16-19, 2005.

12. 'Theory and Applications of Models of Computation 2006', Beijing, China, May 15-20, 2006

13. 'Computability in Europe 2006: Logical Approaches to Computational Barriers', Swansea, Wales, UK, June 30 - July 5, 2006.

14. 'Logic Colloquium 2006', Nijmegen, the Netherlands, July 27 - August 2, 2006.

15. 'Computability in Europe 2007: Computation and Logic in the Real World', Siena, Italy, June 18-23, 2007.

16. 'Logic Colloquium 2007', Wroclaw, Poland, July 14-19, 2007.

17. International Workshop 'Computable Models and Numberings', Novosibirsk, Russia, August 6-11, 2007.

18. "Computability in Europe 2009: Mathematical Theory and Computational Practice", Heidelberg, Germany, July 19-24, 2009.

19. "Logic Colloquium 2010", Paris, France, July 25-31, 2010.

20. "Logic Colloquium 2011", Barcelona, Spain, July 11-16, 2011.

21. "Malcev Meetings 2011 Novosibirsk, Russia, October 11-14, 2011.

22. "Malcev Meetings 2012 Novosibirsk, Russia, November 12-16, 2012.

23. "Computability in Europe 2013: The Nature of Computation", Milan, Italy, July 1-5, 2013.

24. "Logic Colloquium 2019", Prague, Czech Republic, August 11-16, 2019.

25. "17th International Conference on Distributed Computing and Artificial Intelligence", L'Aquila, Italy (online), October 7-9, 2020.

26. "Logic Colloquium 2020", Poznan, Poland (online), July 19-24, 2021

27. "Logical Aspects of Computational Linguistics 2021", Montpellier, France (online), December 13-17, 2021

Long-Term Visits

1. 2005, April-May: University of Siena, Italy (joint work with Prof. Andrea Sorbi, INTAS project).

2. 2006, October-November: University of Sofia, Bulgaria (joint work with Prof. Ivan N. Soskov, INTAS project).

3. 2008, June-July: Technische Universität Darmstadt, Germany (joint RFBR-DFG project).

4. 2009, June-July: Universität Siegen, Germany (joint RFBR-DFG project).