Andrei A. Agrachev
Curriculum Vitae

Mailing Address

International School for Advanced Studies
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Born

March 29, 1952. Moscow, USSR

Education

Moscow State University, 1969 – 1977 (undergraduate, graduate, and post-graduate studies)

Degrees and Honors

- Ph.D., Moscow State University 1977. Title of Ph.D. Thesis: "Second Order Necessary Optimality Conditions."
- Doctor of Sciences, Steklov Mathematical Institute 1989. Title of Doctoral Dissertation: "Topology of Quadratic Mappings and Optimal Control Theory."
- Soviet Academy of Sciences Award in Mathematics, 1989.
- Invited Speaker at the International Congress of Mathematicians ICM-94 in Zürich, Switzerland.
- Member of the Nevanlinna Prize Committee of the International Mathematical Union for ICM-2002 in Beijing, China.
- American Mathematical Society featured review, 2002.
- Panel core member of the International Mathematical Union for ICM-2010 in Hyderabad, India.

- Chair Jean D'Alambert, 2016.

Professional Activity

- All-Union Institute for Scientific Information (VINITI), Moscow, Russia, 1977 – 92. Positions: researcher, senior researcher, leading researcher.
- Steklov Mathematical Institute, Moscow, Russia, 1992 – present. Positions: leading researcher, external collaborator.
- Moscow State University, Department of Mechanics and Mathematics, 1989 – 1997. Positions: associate professor, full professor.
- International School for Advanced Studies (SISSA), Trieste, Italy, 2000 – present. Position: full professor.
- Member of scientific committees of the international conferences: NOLCOS'92 at Bordeaux, France; NOLCOS'95 at Taxoe City, USA; MTNS'96 at St. Louis, USA; NOLCOS'98 at Twente, The Netherlands; Differential Equations and Dynamical Systems, 2000, 2006, 2008, 2010, 2012 at Suzdal, Russia; Feedback and Optimal Control, 2003 at Siena, Italy; NOLCOS'04 at Stuttgart, Germany; IFIP TC7, 2005 at Turin, Italy; NOLCOS'07 at Pretoria, South Africa; Mathematical Control Theory: Controllability, Optimization, Stability, 2009 at Turin, Italy; New Trends in Sub-Riemannian Geometry, 2010 at Nice, France; trimester "Combinatorics and Control", 2010 at Madrid, Spain; NOLCOS'10 at Bologna, Italy; several conferences in SISSA, Trieste, and many others.
- Co-director of the Summer Schools on Mathematical Control Theory and Dynamical Systems, 2001, 2013, 2016, 2019, ICTP, Trieste, Italy.
- Co-director of the European multi-partner Marie Curie Training Site, 2002 – 2006.
- Director of the Trimester on Dynamical and Control Systems, 2003, SISSA–ICTP, Trieste, Italy.
- National coordinator of the MIUR research projects in 2002 – 2003, 2005 – 2006, 2007 – 2008 and 2010 – 2011.

- Member of the scientific committee of the European Research Group project "Control of partial differential equations" started in 2010.
- Head of the research project "Geometric control theory and analysis on metric structures" supported by the Russian Federation, 2013 – 2015.
- Co-organizer of the Trimester "Geometry, analysis and dynamics on subriemannian manifolds", 2014, Institute Henri Poincaré, Paris, France.
- Associate Editor of the SIAM Journal on Control and Optimization, 1993 – 1998.
- Editor-in-Chief of the Journal of Dynamical and Control Systems since 2003 (managing editor, 1995 – 2002); member of the editorial boards of other 5 journals.
- Member of the Board of the Moscow Mathematical Society, 1996 – 1998.
- Scientific consultant of the International Center for Theoretical Physics, Trieste, Italy, 2001 – 2003.
- Selected visiting positions: Institute for Mathematics and its Applications, Minneapolis, USA (Feb. – March 1993); University of Florence, Italy (Nov. 1994 – Feb. 1995, Nov. – Dec. 1996); Bourgogne University, France (May – July 1996, Oct. – Dec. 1997, Feb. – June 1998, May – July 1999); Institute Henri Poincaré, Paris, France (Jan. 1998); International School for Advanced Studies, Trieste, Italy (Nov. – Dec. 1998, Feb. – Apr. 1999, Sept. 1999 – Jan. 2000); Mittag Leffler Institute, Sweden (March – Apr. 2003); University of Nice, France (April – May 2007, May – June 2008); Ecole Polytechnique, France (Fall 2013, Fall 2016 and Spring 2017); Institute Henri Poincaré, France (Fall 2014)
- Over 150 research papers on Control Theory, Optimization, Geometry, and the books:
  - Control Theory from the Geometric Viewpoint, with Yu. Sachkov (Springer Verlag, 2004, xiv+412 pp.)
  - Curvature: A variational Approach, with D. Barilari and L. Rizzi (Amer. Math. Soc., 2018, 142 pp.)

– A Comprehensive Introduction to Sub-Riemannian Geometry, with D. Barilari and U. Boscain (Cambridge Univ. Press, to appear)

Former Ph. D. students

- Andrey Sarychev, 1980, Phys.-Tech. Univ., Moscow.
- Igor Zelenko, 2002, Technion, Haifa.
- Mario Sigalotti, 2003, SISSA, Trieste.
- Natalia Chtcherbakova, 2004, SISSA, Trieste.
- Thomas Chambrion, 2004, Univ. de Bourgogne, Dijon.
- Ulysse Serres, 2006, Univ. de Bourgogne, Dijon.
- Paolo Mason, 2006, SISSA, Trieste.
- Francesca Chittaro, 2007, SISSA, Trieste.
- Sergio Rodrigues, 2008, Univ. of Aveiro.
- Marco Caponigro, 2009, SISSA, Trieste
- Chengobo Li, 2009, SISSA, Trieste
- Francesco Rossi, 2009, SISSA, Trieste
- Roberta Ghezzi, 2010, SISSA, Trieste
- Antonio Lerario, 2011, SISSA, Trieste
- Davide Barilari, 2011, SISSA, Trieste
- Luca Rizzi, 2014, SISSA, Trieste
- Dario Prandi, 2014, SISSA, Trieste
- Alessandro Gentile, 2014, SISSA, Trieste
- Pavel Silveira Diaz, 2015, SISSA, Trieste
- Elisa Paoli, 2015, SISSA, Trieste

- Francesco Boarotto, 2016, SISSA, Trieste
- Carolina Biolo, 2017, SISSA, Trieste
- Khazhgali Kozhasov, 2018, SISSA, Trieste
- Ivan Beschastnyi, 2018, SISSA, Trieste

Some Recent Papers

1. Generalized Ricci curvature bounds for three dymensional contact subriemannian manifolds. Math. Ann., 2014, v.360, 209–253 (with P. Lee)
2. Bishop and Laplacian comparison theorems on 3D contact sub-Riemannian manifolds with symmetry. J. Geom. Anal., 2015, v.25, 512–535 (with P. Lee)
3. Quadratic cohomology. Arnold Math. J., 2015, v.1, 37–58
4. Some open problems. In: "Geometric Control Theory and Sub-Riemannian Geometry", Springer INDAM Series, 2014, 1–13
5. On conjugate times for LQ optimal control problems. J. Dynamical and Control Systems, 2015, v.21, 625–641 (with L. Rizzi and P. Silveira)
6. Geodesics and horizontal-path spaces in Carnot groups. Geometry & Topology, 2015, v.19, 1569–1630 (with A. Gentile and A. Lerario)
7. Tangent hyperplanes to subriemannian balls. J. Dynamical and Control Systems, 2016, v.22, 683–692
8. Sub-Riemannian curvature in contact geometry. J. Geom. Anal., 2017, v.27, 366–408 (with D. Barilari and L. Rizzi)
9. Intrinsic random walks in Riemannian and sub-Riemannian geometry via volume sampling. J. ESAIM:COCV, to appear (with U. Boscain, R. Neel, L. Rizzi)
10. Volume geodesic distortion and Ricci curvature for Hamiltonian dynamics. Annales de l'Institut Fourier, to appear (with D. Barilari, E. Paoli)

11. Homotopically invisible singular curves. Calculus of Variations and PDEs, 2017, v.56, 1–34 (with F. Boarotto, A. Lerario)

12. Introduction to geodesics in sub-Riemannian geometry. In: Barilari D., Boscain U., Sigalotti M. (Eds), Geometry, Analysis and Dynamics on sub-Riemannian manifolds, v.II. EMS SERIES OF LECTURES IN MATHEMATICS, 2016, 1–83 (with D. Barilari, U. Boscain)

13. Ensemble controllability by Lie algebraic methods. J. ESAIM:COCV, 2016, v.22, 921–938 (with Yu. Baryshnikov, A. Sarychev)

14. Switching in time-optimal problem. The 3-D case with 2-D control. J. Dynamical and Control Systems, 2017, v.23, 577–595 (with C. Biolo)

15. Topics in subriemannian geometry. Russian Math. Surveys, 2016, v.71:6, 3–36

16. Switching in time-optimal problem with control in a ball. SIAM J. on Control and Optimization, 2018, v.56, 183–200 (with C. Biolo)

17. Symplectic geometry of constrained optimization. Regular and Chaotic Dynamics, 2017, v.22, 750–770 (with I. Beschastnyi)

18. Optimality of broken extremals. J. Dynamical and Control Systems, to appear (with C. Biolo)

19. Spectrum of the second variation. Proceed. Steklov Math. Inst., to appear

20. Jacobi Fields in optimal control I: Morse and Maslov indices. (with I. Beschastnyi)

21. Jacobi fields in optimal control II: one-dimensional variations. (with I. Beschastnyi)

22. Structure of the endpoint map near nice singular curves. (with F. Boarotto)