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.

- Inria International Chair, 2020–2024.

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, Fall 2014); 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, March – April 2025); Ecole Polytechnique, France (Fall 2013, Fall 2016 and Spring 2017); Sorbonne University, France (2021 – 2025, several visits, 12 months in total).

- Over 160 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, 2020, xviii+745 pp.)

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

- Michele Stecconi, 2020, SISSA, Trieste

- Tommaso Rossi, 2021, Institut Fourier, Grenoble, & SISSA, Trieste

- Alessandro Scagliotti, 2022, SISSA, Trieste

- Stefano Baranzini, 2022, SISSA, Trieste

- Eugenio Bellini, 2024, Milano Bicocca

Some Recent Papers

1. Jacobi Fields in optimal control: Morse and Maslov indices. Nonlinear Analysis, 2022, v.214, 47 p. (with I. Beschastnyi)

2. Normal forms for the endpoint map near nice singular curves for rank-two distributions. J. ESAIM:COCV, 2021, v.27, 32 p. (with F. Boarotto)

3. Control on the manifolds of mappings with a view to the deep learning. J. Dynamical and Control Systems, 2022, v.28, 989–1008 (with A. Sarychev)

4. Ants and bracket generating distributions in dimensions 5 and 6. Automatica, 2023, v.147, 1–10 (with P. Nurowski)

5. Relative heat content asymptotics for sub-Riemannian manifolds. Analysis & PDE, 2024, v.17, 2997–3037 (with L. Rizzi and T. Rossi)

6. Index theorems for graph-parameterized optimal control problems. Nonlinearity, 2023, v.36, 2792–2838 (with S. Baranzini and I. Beschastnyi).

7. "Good Lie brackets" for control affine systems. J. Dynamical and Control Systems, 2024, v.30, 19 p.

8. Lyapunov Exponents of Linear Switched Systems. Regular and chaotic Dynamics, 2025, v.30, 481–503 (with M. Motta)

9. Optimal control for linear systems with L^1-norm cost. J. Optimiz. Theory and Appl., 2025, v.204, 28 p. (with B. Kazandjian)

10. Generic controllability of equivariant systems and applications to particle systems and neural networks. Annales de l'Institut Henri Poincaré C, to appear (with C. Letrouit)

11. Quantitative tightness for three-dimensional contact manifolds: a sub-Riemannian approach. Nonlinearity, to appear (with S. Baranzini, E. Bellini, L. Rizzi)

12. Good Lie brackets for classical and quantum harmonic oscillators. Systems & Control Letters, to appear (with B. Kazandjian and E. Pozzoli)

13. Singular extremals of optimal control problems with L^1 cost. (with I. Beschastnyi and M. Motta)

14. Approximate controllability on the group of volume-preserving diffeomorphisms. (with B. Kazandjian)