

ANDREI GABRIELOV

Birthdate: February 14, 1948

EDUCATION

M.Sc	Moscow State University	1970
Ph.D.	Moscow State University	1973

AWARDS

Award of the Moscow Mathematical Society	1975
Scholarship of the Japan Society for the Promotion of Science	2007

PROFESSIONAL EXPERIENCE

Senior Research Associate	Academy of Sciences of the USSR, Moscow	1973-89
Research Leader	International Center for Science and Technology and International Center for Theoretical Physics, Trieste, Italy	1990-91
Senior Research Associate	Russian Academy of Sciences, Moscow	1990-94
Consultant	Center for Nonlinear Studies, Los Alamos National Laboratory	1992-94
Visiting Scientist	Mathematical Sciences Institute and Department of Geological Sciences, Cornell University	1992-93
Visiting Professor	Department of Mathematics, University of Toronto, Canada	1994
Visiting Scientist,	Mathematical Sciences Institute and Department of Geological Sciences, Cornell University	1994-95
Professor	Departments of Mathematics and Earth and Atmospheric Sciences, Purdue University	1995-

SHORT-TERM VISITING POSITIONS

Visiting Scientist	Institute de Physique du Globe, Univ. Paris-VI, Paris, France	1978
Visiting Scientist	Department of Geology, University of Bologna, Bologna, Italy	1980
Visiting Scientist	International Center for Theoretical Physics, Trieste, Italy	1983
Visiting Scientist	Institute of Geophysics and Planetary Physics, University of California at Los Angeles	1985

SHORT-TERM VISITING POSITIONS (CONT.)

Visiting Scientist	Dept. Physics, Univ. of Alberta, Canada	1987
Visiting Scientist	Intl Center for Theoretical Physics, Trieste, Italy	1988
Visiting scientist	Inst. of Geophysics and Planetary Physics, UCLA	1989
Visiting Scientist	Inst. Physique du Globe, Univ. Paris-VI, Paris, France	1991
Visiting Scientist	Institute of Theoretical Physics, UC Santa Barbara	1992
Visiting Scientist	Inst. of Geophysics and Planetary Physics, UCLA	1992
Visiting Professor	Dept. Mathematics, Univ. Rennes I, France	1993
Visiting Professor	Dept. Mathematics, Univ. de Bourgogne, France	1993
Visiting Fellow	Dept. Mathematics and Informatics, Ecole Normale Superieure, Paris, France	1993
Visiting Fellow	Dept. Mathematics and Informatics, Ecole Normale Superieure, Paris, France	1995
Visiting Scientist	Dept. Geological Sciences, Cornell Univ.	1996
Visiting Scientist	Fields Inst. of Math. Sciences, Toronto, Canada	1997
Visiting Scientist	Math. Sciences Research Institute, UC Berkeley	1998
	Model Theory of Fields	Spring 98
	Symbolic Computation in Geometry and Analysis	Fall 98
Visiting Scientist	Dept. Geological Sciences, Cornell Univ.	1999
Visiting Scientist	Intl Inst. Earthquake Prediction and Math. Geoph., Russian Academy of Sciences, Moscow	2000
Visiting Professor	Dept. of Mathematics, Univ. Rennes I, France	2001
Senior Visitor	Inst. for Mathematics and its Applications, Univ. of Minnesota, Minneapolis	2001
Visiting Professor	Dept. of Mathematics, Univ. Rennes I, France	2003
Visiting Scientist	Math. Sciences Research Institute, UC Berkeley	2004
Visiting Scientist	Isaac Newton Institute, Cambridge, UK	2005
Visiting Professor	Institute Henri Poincare, Paris, France	2005
Visiting Professor	Kinki University, Osaka, Japan	2007
Visiting Scientist	Weizmann Inst. of Science, Rehovot, Israel	2008
Visiting Professor	Centre Interfacultaire Bernoulli, Ecole Polytechnique Federale de Lausanne, Switzerland	2008
Visiting Scientist	Fields Inst. of Math. Sciences, Toronto, Canada	2009
Visiting Professor	Dept. Mathematics, Univ. Rennes I, France	2010
Visiting Scientist	Weizmann Inst. of Science, Rehovot, Israel	2011
Visiting Professor	Department of Mathematics, Federal University of Ceara, Fortaleza, Brazil	2012
Visiting Professor	Department of Mathematics, University of Stockholm, Stockholm, Sweden	2012

MEMBERSHIP IN SCIENTIFIC SOCIETIES

American Mathematical Society
American Geophysical Union

RESEARCH INTERESTS*In Mathematics:*

Real algebraic and analytic geometry
O-minimal structures
Singularities of differentiable mappings
Combinatorial characteristic classes

In Geophysics:

Earthquake prediction
Modeling of seismicity and other processes of failure

Interdisciplinary:

Nonlinear science, Dynamical systems
Self-similarity, Renormalization

REFEREED PUBLICATIONS

1. Gabrielov, A., Projections of semi-analytic sets, *Funct. Anal. Appl.*, 1968, v.2, n.4, p.18-30, in Russian. English translation: p.282-291
2. Gabrielov, A., On a theorem of Hörmander, *Funct. Anal. Appl.*, 1970, v.4, n.2, p.18-22, in Russian. English translation: p.106-109
3. Gabrielov, A., Formal relations between analytic functions, *Funct. Anal. Appl.*, 1971, v.5, n.2, p.64-65, in Russian. English translation: p.318-319
4. Gabrielov, A., Formal relations between analytic functions, *USSR Izv., Ser. Math.*, 1973, v.37, n.5, p.1056-1090
5. Gabrielov, A., Intersection matrices for certain singularities, *Funct. Anal. Appl.*, 1973, v.7, n.3, p.18-32, in Russian. English translation: p.182-193
6. Gabrielov, A., Bifurcations, Dynkin diagrams, and modality of isolated singularities, *Funct. Anal. Appl.*, 1974, v.8, n.2, p.7-12, in Russian. English translation: p.94-98
7. Gabrielov, A., Dynkin diagrams for unimodal singularities, *Funct. Anal. Appl.*, 1974, v.8, n.3, pp.1-6, in Russian. English translation: p.192-196
8. Gabrielov, A., Gelfand, I., and Losik, M., Combinatorial calculation of characteristic classes, *Funct. Anal. Appl.*, 1975, v.9, n.1, p.54-55, in Russian. English translation: p.48-49
9. Gabrielov, A., Gelfand, I., and Losik, M., Combinatorial computation of characteristic classes, *Funct. Anal. Appl.*, 1975, v.9, n.2, p.12-28, in Russian. English translation: p.103-115
10. Gabrielov, A., Gelfand, I., and Losik, M., Combinatorial calculus of characteristic classes, *Funct. Anal. Appl.*, 1975, v.9, n.3, p.5-26, in Russian. English translation: p.186-202
11. Gabrielov, A., and Kushnirenko, A., Description of deformations with constant Milnor number for homogeneous functions, *Funct. Anal. Appl.*, 1975, v.9, n.3, p.88-89, in Russian. English translation: p.329-331

12. Gabrielov, A., Gelfand, I., and Losik, M., A local combinatorial formula for the first Pontryagin class, *Funct. Anal. Appl.*, 1976, v.10, n.1, p.14-17, in Russian. English translation: p.12-15
13. Gabrielov, A., Fuchs, D., and Gelfand, I., The Gauss-Bonnet theorem and the Atiyah-Patodi-Singer functionals for the characteristic classes of foliations, *Topology*, 1976, v.15, pp.165-188
14. Gabrielov, A., Gelfand, I., and Losik, M., Atiyah-Patodi-Singer functionals for characteristic classes of tangent bundles, *Funct. Anal. Appl.*, 1976, v.10, n.2, p.13-28, in Russian. English translation: p.95-107
15. Gabrielov, A., Monodromy groups and adjacency of singularities, *Uspekhi Math. Nauk*, 1977, v.32, n.2, pp.61-63, in Russian
16. Gabrielov, A., Combinatorial computation of characteristic classes, *Uspekhi Math. Nauk*, 1977, v.32, n.4, p.237-238, in Russian
17. Gabrielov, A., Alekseevskaya, M., Gvishiani, A., Gelfand, I., and Rantsman, E., Morphostructural zoning of mountain countries with formalized patterns, *Comput. Seismology*, 1977, v.10, p.33-49, in Russian
18. Gabrielov, A., Gorshkov, A., and Rantsman, E., Experience in morphostructural zoning with formalized patterns, *Comput. Seismology*, 1977, v.10, p.50-58, in Russian
19. Gabrielov, A., Alekseevskaya, M., Gvishiani, A., Gelfand, I., and Rantsman, E., Formal Morphostructural Zoning of mountain territories, *J. of Geoph.*, 1977, v.43, n.1/2, p.227-235
20. Gabrielov, A., Combinatorial formulas for Pontryagin classes and GL-invariant cocycles, *Funct. Anal. Appl.*, 1978, v.12, n.2, p.1-7, in Russian. English translation: p.75-80
21. Gabrielov, A., Characteristic Pontryagin classes in a Cech complex, *Funct. Anal. Appl.*, 1979, v.13, n.2, p.1-10, in Russian. English translation: p.80-86
22. Gabrielov, A., Polar curves and intersection matrices of singularities, *Inventiones Mathematicae*, 1979, v.54, p.15-23
23. Gabrielov, A., Gvishiani, A., and Zhidkov, M., Formalized morphostructural zoning of the Andes mountain belt, *Comput. Seismology*, v.14, 1982, p.38-55, in Russian. English translation: p.37-55
24. Gabrielov, A., Caputo, M., Keilis-Borok, V., and Sidorenko, T., Long-range seismological precursors of strong earthquakes IV. Italy, *Comput. Seismology*, v.15, 1983, p.35-43, in Russian. English translation: p.37-45
25. Gabrielov, A., Diffraction of Love waves at a vertical interface, *Comput. Seismology*, v.16, 1984, p.165-170, in Russian. English translation: p.160-165
26. Gabrielov, A., Caputo, M., and Sidorenko, T., Long-term precursors of strong earthquakes in Italy, *Doklady Akad. Nauk USSR*, 1983, v.274, n.1, p.835-837.
27. Gabrielov, A., Caputo, M., and Sidorenko, T., Long-Term Premonitory Seismicity Patterns in Italy, *Geophys. J. R. astr. Soc.*, 1983, v.74, p.71-75.
28. Gabrielov, A., and Keilis-Borok, V., Patterns of stress corrosion: geometry of the principal stresses, *Pure and Applied Geophysics*, 1983, v.121, n.3, p.477-494.
29. Gabrielov, A., and Keilis-Borok, V., Migration of fluids and weakening of the fault zones, In: *O. Yu. Schmidt and the Soviet Geophysics*, Moscow, Nauka, 1984, p.159-171, in Russian.
30. Gabrielov, A., and Keilis-Borok, V., Geometry of the principal stress field: trajectories of loss of strength due to the Rhebinder effect, *Comput. Seismology*, v.17, 1984, p.17-24, in Russian. English translation: p.16-23.
31. Gabrielov, A., Keilis-Borok, V., Levshina, T., and Shaposhnikov, V., Block model of the lithosphere dynamics, *Comput. Seismology*, v.19, 1986, p.168-177, in Russian. English translation: p.158-167.

32. Gabrielov, A., and Palamodov, V., Guegens principle and its generalizations, In: *I. Petrovsky, Selected works*, Moscow, Nauka, 1986, p.449-456, in Russian.
33. Gabrielov, A., Proof of Petrovsky's theorem, In: *I. Petrovsky, Selected works*, Moscow, Nauka, 1986, p.456-465, in Russian.
34. Gabrielov, A., Dmitrieva, O., Keilis-Borok, V., *et al.* Long-term earthquake prediction (methodical recommendations), *Inst. Phys. Earth*, Moscow, 1986, 127p., in Russian.
35. Gabrielov, A., Dmitrieva, O., Keilis-Borok, V., *et al.* Algorithms of long-term earthquakes' prediction, *Intl. School for Earthquake Research Oriented to Prediction*, Lima, Peru, 1986.
36. Gabrielov, A., and Keilis-Borok, V. Model of the lithosphere dynamics and earthquake flow: integral features, instability, bifurcation, *Proc. XXIX General Assembly of IUGG*, 1987.
37. Gabrielov, A., Levshina, T., and Rotwain, I., Block model of the lithosphere dynamics and earthquake prediction, *Comput. Seismology*, v.22, 1989.
38. Gabrielov, A., and Newman, W. I., Failure of hierarchical structures, *Comput. Seismology*, v.23, 1990.
39. Gabrielov, A., Levshina, T., and Rotwain, I., Block model of earthquake sequence, *Phys. Earth Plan. Interior*, 1990, v.61, n.1-2, p.18-28.
40. Gabrielov, A., and Newman, W. I., Failure of hierarchical distributions of fiber bundles. I, *Internat. J. of Fracture*, 1991, v.50, p.1-14.
41. Gabrielov, A., Modeling of seismicity in search for precursors, in: *Earthquake Predictions: State-of-the-Art*, Balkema 1991.
42. Gabrielov, A., Gahalaut, V., Kuznetsov, I., Rotwain, I., and Keilis-Borok, V., Application of pattern-recognition algorithm in the seismic belts of Indian convergent plate margin - CN Algorithm, *Proc. Ind. Ac. Sci. - Earth and Planetary Sciences*, 1992, v.101, n.3, p.227-238.
43. Gabrielov, A., Gahalaut, V., Kuznetsov, I., Kosobokov, V., and Keilis-Borok, V., Application of pattern-recognition algorithm in the seismic belts of Indian convergent plate margin - M8 Algorithm, *Proc. Ind. Ac. Sci. - Earth and Planetary Sciences*, 1992, v.101, n.3, p.239-254.
44. Gabrielov, A., Abelian avalanches and Tutte polynomials, *Physica A*, 1993, v.195, p.253-274.
45. Gabrielov, A., Avalanches, Sandpiles and Tutte Decomposition, In: *The Gelfand Mathematical Seminars*, 1990-1992, p.19-26, Birkhäuser, 1993.
46. Gabrielov, A., Newman, W.I., and Turcotte, D.L., editors: *Nonlinear Dynamics and Predictability of Geophysical Phenomena*, AGU, 1994.
47. Gabrielov, A., and Newman, W.I., Seismicity modeling and earthquake prediction: a review, In: *Nonlinear Dynamics and Predictability of Geophysical Phenomena*, p.7-14, AGU, 1994.
48. Gabrielov, A., Newman, W. I., and Knopoff, L., Lattice models of failure: sensitivity to the local dynamics, *Phys. Rev. E*, 1994, v.50, n.1, p.188-197.
49. Gabrielov, A., Lion, J.-M., and Moussu, R., Ordre de contact de courbes intégrales du plan, *CR Acad. Sci. Paris*, 1994, t.319, p.219-221.
50. Gabrielov, A., Newman, W. I., Durand, T.A., Phoenix, S.L., and Turcotte, D.L., An exact renormalization model for earthquakes and material failure: statics and dynamics, *Physica D*, 1994, v.77, 200-216.
51. Gabrielov, A., and Vorobjov, N., Complexity of stratifications of semi-Pfaffian sets, *J. Discrete and Computational Geometry*, 14, 71-91, 1995.
52. Gabrielov, A., Multiplicities of Pfaffian Intersections and the Lojasiewicz Inequality, *Selecta Mathematica*, New Series, 1, 113-127, 1995.
53. Gabrielov, A., Newman, W.I., Phoenix, S.L., and Turcotte, D.L., Failure of hierarchically structured materials: statics and dynamics, In P.E. Cladis, P. Palfy-Muhoray, eds., *Spatio-temporal patterns in nonequilibrium complex systems: NATO advanced research workshop*, p. 581-597, Addison-Wesley, 1995.

54. Gabrielov, A., Multiplicities of zeroes of polynomials on trajectories of polynomial vector fields and bounds on degree of nonholonomy, *Mathematical Research Letters*, 2, 437-451, 1995.
55. Gabrielov, A., Newman, W.I., and Turcotte, D.L., Log-periodic behavior of a hierarchical failure model with applications to precursory seismic activation, *Physical Reviews E*, 52, 4827-4835, 1995.
56. Gabrielov, A., Complements of subanalytic sets and existential formulas for analytic functions, *Inventiones Mathematicae*, 125 1-12, (1996).
57. Gabrielov, A., Keilis-Borok, V., and Jackson, D.D., Geometric incompatibility in a fault system, *Proc. Natl. Acad. Sci., USA*, 93, 3838-3842, 1996.
58. Gabrielov, A., Morein, G., Turcotte, D. On the Statistical Mechanics of Distributed Seismicity, *Geophys. J. Int.*, 131, 552-558, 1997.
59. Gabrielov, A., Newman, W.I., and Turcotte, A. Fractal trees with side branching, *Fractals*, 5, 603-614, 1997.
60. Gabrielov, A., Frontier and closure of a semi-Pfaffian set, *J. Discrete and Computational Geometry*, 19, 605-617, 1998.
61. Gabrielov, A. and Khovanskii, A., Multiplicity of a Noetherian intersection, *Amer. Math. Soc. Transl.*, 186, 119-130, 1998.
62. Gabrielov, A., Jean, F., Risler, J.-J., Multiplicity of polynomials on trajectories of polynomial vector fields in C^3 , Singularities Symposium-Lojasiewicz 70, Banach Center Publ. 44, 109-121, Warsaw, 1998.
63. Gabrielov, A., Coxeter-Dynkin diagrams and singularities, in selected papers of E. B. Dynkin, *AMS*, 367-369, 2000.
64. Gabrielov, A., Multiplicity of a zero of an analytic function on a trajectory of a vector field, The Arnoldfest, Fields Inst. Communications, *AMS*, 191-200, 1999.
65. Gabrielov, A., Newman, W. I., and Turcotte, D. L., An exactly soluble hierarchical clustering model: inverse cascades, self-similarity and scaling, *Phys. Rev. E.*, 60, 5293-5300, 1999.
66. Gabrielov, A., Keilis-Borok, V., Zaliapin, I., Newman, W. I., Critical transitions in colliding cascades, *Phys. Rev. E.*, 62, 237-249, 2000.
67. Gabrielov, A., Zaliapin, I., Newman, W.I., Keilis-Borok, V. I., Colliding cascades model for earthquake prediction, *Geophysical J. International*, 143, 427-437, 2000.
68. Turcotte, D. L., Newman, W. I., and Gabrielov, A., A statistical physics approach to earthquakes, *Geocomplexity and the Physics of Earthquakes*, AGU, 83-96, 2000.
69. Gabrielov, A., and Vorobjov, N., Complexity of cylindrical decompositions of sub-Pfaffian sets, *J. of Pure and Applied Algebra*, 164, 179-197, 2001.
70. Eremenko, A., and Gabrielov, A. The Wronski map and Grassmannians of real codimension 2 subspaces, *Computational Methods and Function Theory*, 1, 1-25, 2001.
71. Eremenko, A., and Gabrielov, A. Rational functions with real critical points and the B. and M. Shapiro conjecture in real enumerative geometry, *Annals of Mathematics*, 155, 105-129, 2002.
72. Eremenko, A., and Gabrielov A., Counterexamples to pole placement by static output feedback. *Linear Algebra and its Applications*, 351-352, 211-218, 2002.
73. Eremenko, A., and Gabrielov, A. Degrees of real Wronski maps. *Discrete and Computational Geometry*, 28, 331-347, 2002.
74. Eremenko, A., and Gabrielov, A. Pole placement by static output feedback for generic linear systems. *SIAM J. on Control and Optimization*, 41, 303-312, 2002.
75. Gabrielov, A. Relative closure and the complexity of Pfaffian elimination. In *Discrete and Computational Geometry: The Goodman-Pollack Festschrift*. Springer, 2003.

76. Gabrielov, A., and Zell, T. On the number of connected components of the relative closure of a semi-Pfaffian family. In: *Algorithmic and Quantitative Real Algebraic Geometry*, AMS, 65-76, 2003.
77. Gabrielov, A., Vorobjov, N., and Zell, T. Betti numbers of semialgebraic and sub-Pfaffian sets, *J. London Math. Soc.*, v. 69, 27-43, 2004.
78. Gabrielov, A. and Vorobjov, N. Complexity of computations with Pfaffian and Noetherian functions. In: *Normal Forms, Bifurcations and Finiteness Problems in Differential Equations. NATO Science Series II*, v. 137, 211-250, 2004.
79. Keilis-Borok, V., Shebalin, P., Gabrielov, A., and Turcotte, D., Reverse Tracing of Short-Term Earthquake Precursors. *Physics of the Earth and Planetary Interiors*, v. 145, 75-85, 2004.
80. Zaliapin, I., Gabrielov, A., and Keilis-Borok, V., Multiscale trend analysis for time series. *Fractals*, v. 12, 275-292, 2004.
81. Gabrielov, A., and Vorobjov, N., Betti numbers for quantifier-free formulae. *Discrete and Computational Geometry*, v. 33, 395-401, 2005.
82. Yakovlev, G., Newman, W.I., Turcotte, D.L., Gabrielov, A., An inverse cascade model for self-organized complexity and natural hazards. *Geophys J. Intl*, v. 163, 433-442, 2005.
83. Zaliapin, I., Wong, H., Gabrielov, A., Inverse cascade in percolation model: hierarchical description of time-dependent scaling. *Phys. Rev. E*, v. 71, 066118, 2005.
84. Eremenko, A., Gabrielov, A., Shapiro, M., Vainshtein, A., Rational functions and real Schubert calculus. *Proc. Amer. Math. Soc.*, v. 134, 949-957, 2006.
85. Shebalin, P., Keilis-Borok, V., Gabrielov, A., Zaliapin, I., and Turcotte, D.L., Short-term earthquake prediction by reverse analysis of lithosphere dynamics, *Tectonophysics*, v. 413, 63-75, 2006.
86. Zaliapin, I., Wong, H., and Gabrielov, A., Hierarchical aggregation in percolation model, *Tectonophysics*, v. 413, 93-107, 2006.
87. Gabrielov, A., Keilis-Borok, V.I., Pinsky, V., Podvigina, O.M., Shapira, A., Zheligovsky, V.A., Fluid migration and dynamics of a blocks-and-faults system, *Tectonophysics*, v. 429, 229-251, 2007.
88. Gabrielov, A., Novikov, D., Shapiro, B., Mystery of point charges. *Proc. London Math. Soc.*, v. 95, 443-472, 2007; doi:10.1112/plms/pdm012.
89. Gabrielov, A., Counter-examples to quantifier elimination for fewnomial and exponential expressions. *Moscow Math. J.*, v. 7, 453-460, 2007.
90. Eremenko, A., Gabrielov, A., Shapiro, B., High energy eigenfunctions of one-dimensional Schrodinger operators with polynomial potentials. *Comput. Methods and Func. Theory*, v. 8, 513-529, 2008.
91. Eremenko, A., Gabrielov, A., Shapiro, B., Zeros of eigenfunctions of some anharmonic oscillators. *Ann. Inst. Fourier*, v.58, 603-624, 2008.
92. Zaliapin, I., Gabrielov, A., Keilis-Borok, V., Wong, H., Clustering analysis of seismicity and aftershock identification. *Phys. Rev. Letters*, v.101, 018501, 2008.
93. Gabrielov, A., Keilis-Borok, V., Sinai, Ya., Zaliapin, I., Statistical Properties of the Cluster Dynamics of the Systems of Statistical Mechanics. In: *Boltzmann's Legacy*, ESI Lectures in Mathematics and Physics, EMS Publishing House, 2008, p.203-216.
94. Eremenko, A., Gabrielov, A., Analytic continuation of eigenvalues of a quartic oscillator. *Comm. Math. Physics* v.287 p.431-457, DOI 10.1007/s00220-008-0663-6, 2009.
95. Gabrielov, A., Vorobjov, N., Approximation of definable sets by compact families, and upper bounds on homotopy and homology. *Proc. London Math. Soc.*, v.0, p.45-54, doi: 10.1112/jlms/jdp006, 2009.

96. Keilis-Borok, V., Gabrielov, A., Soloviev, A., Geo-complexity and earthquake prediction. In: Encyclopedia of Complexity and Systems Science, Part 7, p.4178-4194, DOI: 10.1007/978-0-387-30440-3_246, Springer, 2009.
97. Eremenko, A., Gabrielov, A., Tangencies between holomorphic maps and holomorphic laminations. Proc. Amer. Math. Soc. v.138, p.2489-2492, 2010.
98. Eremenko, A., Gabrielov, A., Elementary proof of the B. and M. Shapiro conjecture for rational functions.
In: Notions of positivity and the geometry of polynomials, p.167-178, Springer, 2011.
99. Azar, M., Gabrielov, A., Some lower bounds in the B. and M. Shapiro conjecture for flag varieties. Discr. Comput. Geom. v.46, p.636-659, 2011.
100. Eremenko, A., Gabrielov, A., Quasi-exactly solvable quartic: elementary integrals and asymptotics. J. Phys. A: Math. Theor. v.44, p.312001, 2011.
101. Eremenko, A., Gabrielov, A., Singular perturbations of polynomial potentials in the complex domain with applications to PT-symmetric families. Moscow Math. J., v.11, p.473-503, 2011.
102. Alexandersson, P., Gabrielov, A., On eigenvalues of the Schrodinger operator with a complex-valued polynomial potential. Comput. Methods and Function Theory v.12, p.119-144, 2012.
103. Eremenko, A., Gabrielov, A., Irreducibility of some spectral determinants. J. Phys. A: Math. Theor., 2012.
104. Eremenko, A., Gabrielov, A., Quasi-exactly solvable quartic: real algebraic spectral locus. J. Phys. A: Math. Theor., v.45, 175205, 2012.
105. A. Eremenko, A. Gabrielov. Two-parametric PT-symmetric quartic family. J. Phys. A: Math. Theor. v.45 (2012) 175206.
106. Basu, S., Gabrielov, A., Vorobjov, N., Semi-monotone sets. J. European Math. Soc., v.15 p.635-657, 2013.
107. Basu, S., Gabrielov, A., Vorobjov, N., Helly-type theorem for semi-monotone sets and monotone maps. Discrete and Comput Geometry, DOI 10.1007/s00454-013-9540-y (2013).
108. Basu, S., Gabrielov, A., Vorobjov, N., Monotone functions and maps. Revista Real Acad. Cienc. Exactas, Fisicasy Naturales. Ser. A. Matematicas (RACSAM) v.107 (2013) 5-33.

PREPRINTS

1. Gabrielov, A., Newman, W.I., Failure of hierarchical distributions of fiber bundles. II, Preprint, 1991.
2. Gabrielov, A., Asymmetric Abelian Avalanches and Sandpiles, Preprint 93-65, MSI, Cornell Univ., 1993.
3. Gabrielov, A., Keilis-Borok, V., Olsen, S., Zaliapin, I., Predictability of extreme events in a branching diffusion model. arXiv:1003.0017, 2010.
4. Basu, S., Gabrielov, A., Vorobjov, N., Toric cubes are closed balls. arXiv:1202.5572, 2012.

GRANTS

- NSF - Co-PI, "Application of Dynamical Systems to Earthquake Prediction", (PI - D. Turcotte, Cornell), (1995-1998)
- NSF - Co-PI, "Application of Dynamical Systems to Earthquake Prediction", (PI - D. Turcotte, Cornell), (1998-2001)
- NSF - PI, "Subanalytic Sets, Pfaffian Functions, and Complexity of Quantifier Simplification", (1997-2000)

- Civilian Research and Development Foundation – PI, “Modeling of the impact of migrating fluids on dynamics of blocks-and-faults system with special attention to instability and critical phenomena”, (2000-2002).
- NSF – PI, “Complexity of operations with Pfaffian and Noetherian functions and effective o-minimality”, (2000-2003).
- The 21st Century Collaborative Activity Award for Studying Complex systems – Co-PI, “Understanding and prediction of critical transitions in complex systems” (PI – V. Keilis-Borok, UCLA) – James S. McDonnell Foundation (2001-2003).
- NSF – PI, “Effective Non-Oscillation of Solutions of Fuchsian Systems of Differential Equations and Abelian Integrals,” (2002-2006).
- NSF – PI, “Topological Complexity and Quantitative O-Minimality”, (2003-2006).
- NSF – PI, “CMG Collaborative Research: Cellular Automata, Directed Graphs, and the Modeling of Earthquakes and Landforms”, (2003-2006).
- NSF – PI, “Homotopy, Complexity, and O-Minimality”, (2008-2012).
- NSF – Co-PI, “Meromorphic functions and their applications”, (2011-2014).
- NSF – PI, “Semi-monotone sets and triangulation of definable families”, (2012-2015).

INVITED TALKS

1. “Geometric Incompatibility in a Fault System,” IUGG XXI General Assembly, Boulder, CO July 2-14, 1995.
2. “Finiteness Properties for Functions Defined by Polynomial Pfaffian Equations,” AMS-SIAM Summer Seminar in Applied Mathematics, Park City, UT, July 17-August 11, 1995.
3. “Complexity of Frontier and Closure of Semi-Pfaffian Sets and Quantifier Simplification for Semi-Pfaffian Expressions,” Meeting of the American Mathematical Society, Baton-Rouge, LA, April 19-21, 1996.
4. “Geometric Incompatibility of Tectonic Faults and Dynamics of Seismicity,” International Conference on Mathematical Geophysics, Santa Fe, NM, June 16-21, 1996.
5. “Finiteness Properties for Pfaffian Function and Complexity of Quantifier Simplification,” International Workshop on Model Theory of Analytic Functions, Toronto, March 17-21, 1997
6. “The multiplicity of a Noetherian Intersection,” International Workshop on Geometry and Complexity, Toronto, May 5-10, 1997.
7. “Multiplicity of a Zero of an Analytic Function on a Trajectory of a Vector Field,” Meeting of the American Mathematical Society, College Park, MD, April 12-13, 1997.
8. “Geometric Incompatibility of a Fault System. Lattice Models of Failure: from Earthquakes to Groebner Bases,” Fourth Workshop on Non-Linear Dynamics and Earthquake Prediction, International Center for Theoretical Physics, Trieste, Italy, October 6-24, 1997.
9. “Multiplicity of a Noetherian Intersection,” Meeting of the American Mathematical Society, Montreal, Canada, September 26-28, 1997.
10. “Complexity of computations with Pfaffian and Noetherian functions,” Workshop on Model Theory, Algebra and Arithmetic, MSRI, Berkeley, CA, June 1-6, 1998.
11. “The multiplicity of a polynomial on the solution of a differential equation,” Seminar on Commutative Algebra, Algebraic Geometry, and Combinatorics, UC Berkeley, CA, September 8, 1998.
12. “Multiplicity of a solution of a system of Noetherian equations,” Intl. Conference on Solving Systems of Equations, MSRI, Berkeley, CA, September 14-18, 1998.

13. "Complexity of the complement of a subpfaffian set," Working Group in Real Algebraic Geometry and Algorithms," MSRI, Berkeley, CA, September 24, 1998.
14. "Complexity of the complement of a subpfaffian set," Joint Mathematics Meeting, San Antonio, TX, January 13-16, 1999.
15. "Precursory seismicity patterns: recent results and emerging possibilities," EGS General Assembly, Hague, Netherlands, April 19-23, 1999.
16. "Connection between structure, dynamics and instability of the Lithosphere," IUGG General Assembly, Birmingham, UK, July 18-30, 1999.
17. "Earthquake prediction: recent results and what comes next," IUGG General Assembly, Birmingham, UK, July 18-30, 1999.
18. "Rational functions with real critical points, real Schubert calculus, and a conjecture of Shapiro and Shapiro," Workshop on Computational Algebraic Analysis, MSRI, Berkeley, CA, January 5-7, 2000.
19. "Rational functions with real critical points and real enumerative geometry," Mathematics Department Colloquium, Purdue University, February 29, 2000.
20. "Precursory seismicity patters: recent results and emerging possibilities," European Geophysical Society, General Assembly, Hague, Netherlands, April 19-23, 1999.
21. "Complexity of cylindrical decomposition for restricted sub-Pfaffian sets," International Meeting "Effective Methods in Algebraic Geometry" (MEGA) Bath, UK, June 20-24, 2000.
22. "Connection between structure, dynamics and instability of the Lithosphere," International Union of Geodesy and Geophysics, General y Assembly, Birmingham, UK, July 18-30, 1999.
23. "Earthquake prediction: recent results and what comes next," International Union of Geodesy and Geophysics, General Assembly, Birmingham, UK, July 18-30, 1999.
24. "New perspective in earthquake prediction," International Geological Congress, Rio de Janeiro, August 2000.
25. "Geodynamic background of earthquake prediction," Keynote lecture, Special Symposium B-9.
26. "Scaling in a hierarchical model of clustering," The Earth: Earthquakes and Seismic Waves, Leon Knopoff Anniversary Symposium, UCLA, September 14, 2000.
27. "Rational functions with real critical points, the Catalan numbers, and the Schubert calculus," Mathematics Department Colloquium,, Ohio State University, October 10, 2000.
28. "Multiplicity of a Noetherian intersection and resolution of Noetherian singularities," AMS Meeting, San Francisco, CA, October 21-22, 2000.
29. Mathematics Department Colloquium, Notre Dame University, December 4, 2000.
30. "Rational functions with real critical points, the Catalan numbers, and the Schubert calculus".
31. "Migration of fluids and dynamics of blocks-and-faults system," American Geophysical Union Fall Meeting, San Francisco, December 15-19, 2000.
32. "Premonitory redistribution of seismicity over the fault network in southern California," American Geophysical Union Fall Meeting, San Francisco, December 15-19, 2000.
33. "Selforganization of critical transitions in the colliding cascades with applications to earthquake prediction," American Geophysical Union Fall Meeting, San Francisco, December 15-19, 2000.
34. "Premonitory change of scaling in seismicity," American Geophysical Union Fall Meeting, San Francisco, December 15-19, 2000.
35. "Scaling in a hierarchical model of clustering," American Geophysical Union Fall Meeting, San Francisco, December 15-19, 2000.

36. "Pfaffian complexity," DIMACS Workshop on Algorithmic and Quantitative Aspects of Real Algebraic Geometry in Mathematics and Computer Science, DIMACS Center, Rutgers University, March 12-16, 2001.
37. "Computations with Pfaffian and Noetherian functions," International Conference on Real Algebraic and Analytic Geometry, University of Rennes I, France, June 11-15, 2001.
38. "Degrees of real Grassmann varieties," International Conference on Geometrie Moderee et Integrales Abeliennes, CIRM, Luminy-Marseille, France, June 25-29, 2001.
39. "Degrees of real Grassmann varieties," Geometrie Moderee et Integrales Abeliennes, CIRM, Luminy-Marseille, France, June 25-29, 2001.
40. "Degree of the real Grassmann variety," Mathematics Department, University of Minnesota, September 17, 2001.
41. "Combinatorics of the real Wronski map," Mathematics Department, University of Minnesota, September 19, 2001.
42. Workshop Convener, "Spatio-temporal Patterns in the Geosciences," Institute for Mathematics and its Applications, University of Minnesota, September 25-29, 2001.
43. "An Exactly Soluble Hierarchical Clustering Model: Inverse Cascades, Self-Similarity, and Scaling," Institute for Mathematics and its Applications, University of Minnesota, October 1, 2001.
44. Conference Convener, "Vladimir Keilis-Borok's 80th Birthday Festschrift," Institute for Mathematics and its Applications, University of Minnesota, October 5-6, 2001.
45. "Modeling of seismicity: a mathematician's perspective," Complexity in Geophysical Systems, Institute for Mathematics and its Applications, University of Minnesota, October 8-12, 2001.
46. "Degree of the real Wronski map," Mathematics Department, University of Michigan, Ann Arbor, November 2, 2001.
47. "Ensemble of premonitory seismicity patterns," American Geophysical Union Fall Meeting, San Francisco, December 10-14, 2001.
48. "Colliding Cascades and Boolean Delay Equations," American Geophysical Union Fall Meeting, San Francisco, December 10-14, 2001.
49. "Betti numbers of sub-Pfaffian sets," Reelle Algebraische und Analytische Geometrie, Oberwolfach, Germany, March 17-23, 2002.
50. "Understanding and prediction of critical transitions in complex systems," The James S. McDonnell Foundation 21st Century Science Initiative Annual Meeting, Tarrytown, NY, June 17-20, 2002.
51. "Complexity of computations with Pfaffian and Noetherian functions" (4 lectures), Normal Forms, Bifurcations and Finiteness Problems in Differential Equations, Seminaire de Mathematiques Superieures, Seminaire Scientifique OTAN, Universite de Montreal, Canada, July 8-19, 2002.
52. "Betti numbers of semialgebraic and sub-Pfaffian sets" (Semi-plenary lecture), Computational Algebraic Geometry, Foundations of Computational Mathematics, Institute for Mathematics and its Applications, Minneapolis, August 8-10, 2002.
53. "Counterexamples to pole placement by real static output feedback," Fifteenth International Symposium on Mathematical Theory of Networks and Systems, University of Notre Dame, August 12-16, 2002.
54. "Multiscale trend analysis: a new approach to studying complex time series," American Geophysical Union Fall Meeting, San Francisco, December 6-10, 2002.
55. "On the short-term earthquake prediction: renormalization algorithm and observational evidence in S. California, E. Mediterranean, and Japan," American Geophysical Union Fall Meeting, San Francisco, December 6-10, 2002.

56. "Cascade of clusters – from metaphor to algorithm?," American Geophysical Union Fall Meeting, San Francisco, December 6-10, 2002.
57. "Betti numbers of definable sets," Centro de Giorgi, Pisa, Italy, March 20, 2003.
58. "Degree of the real Wronski map," MIT Combinatorics Seminar, May 7, 2003.
59. "Betti numbers of definable sets," Logic and Mathematics, University of Illinois at Urbana-Champaign, May 21-25, 2003.
60. "Multiplicity of a Noetherian intersection," Algebra Seminar, Department of Mathematics, Univ. Autonoma de Madrid, Spain, June 16, 2003.
61. "Betti numbers of definable sets," Joint meeting AMS and RSME, Seville, Spain, June 18-21, 2003.
62. "Rational functions with real critical points," Mathematics Department Colloquium, University of North Carolina at Chapel Hill, August 21, 2003.
63. "Betti numbers of sub-algebraic and sub-Pfaffian sets," Workshop on Singularities, Mathematisches Forschungsinstitut Oberwolfach, Germany, September 25-27, 2003.
64. "Short-term premonitory rise of the earthquake correlation range," Fall AG, San Francisco, December 8-12, 2003.
65. "Geometry of faults and earthquake prediction," Science of Earthquake Prediction, SCEC/USGS/CGS Workshop, USC, February 20, 2004.
66. "Betti numbers of semialgebraic sets," Seminar, Georgia Tech, March 17, 2004.
67. "Rational functions with real critical points," Colloquium, Georgia Tech, March 18, 2004.
68. Betti numbers of semialgebraic and sub-Pfaffian sets, Singularity Theory - in honor of S. Lojasiewicz, Jagiellonian University, Cracow, Poland, March 21-27, 2004.
69. Betti numbers of semi- and subalgebraic sets, Seminar, Mathematical Sciences Research Institute, Berkeley, April 14, 2004.
70. Lower bounds in some problems of real Schubert calculus, AMS Fall Central Section Meeting, Northwestern University, October 23-24, 2004.
71. Short-Term Earthquake Prediction Based on the Reverse Tracing of Lithosphere Dynamics, AGU Fall Meeting, December 13-16 2004.
72. Hierarchical Description of Evolution of an Inverse Cascade in Percolation Model, AGU Fall Meeting, December 13-16, 2004.
73. Degree of the real Wronski map and the pole placement problem in control theory. Department of Mathematics, Weizmann Institute of Science, Rehovot, Israel, December 21, 2004.
74. The mystery of point charges. Department of Mathematics Seminar, Tel Aviv University, Israel, December 29, 2004.
75. The mystery of point charges, Department of Computer Sciences, University of Bath, UK, May 11, 2005.
76. Degrees of the real Wronski maps, Department of Mathematics, Durham University, UK, May 16, 2005.
77. The mystery of point charges, The Isaac Newton Institute, Cambridge, UK, May 25, 2005.
78. Rational functions and real Schubert calculus, The Isaac Newton Institute, Cambridge, UK, May 26, 2005.
79. Lower bounds in some problems of real Schubert calculus, Workshop on Computational Algebraic Geometry, Santander, Spain, June 30 - July 2, 2005.
80. Pfaffian functions and Sparsity, Institute Henri Poincare, Paris, France, October 20-21, 2005.
81. Real Schubert calculus and the B. and M. Shapiro conjecture, Institute Henri Poincare, Paris, France, October 27-28, 2005.
82. Rational functions with real critical points, the Catalan numbers, and real Schubert calculus, Mathematics Department Colloquium, IUPUI, November 18, 2005.

83. Reverse Tracing of Precursors: Ongoing Experiment in the Months-in-Advance Earthquake Prediction, AGU Fall Meeting, San Francisco, December 5-9, 2005.
84. Invariants of maximally inflected real rational quintics, Workshop on Singularities, Mathematisches Forschungsinstitut Oberwolfach, Germany, September 10-16, 2006.
85. Deviations from Scale-Invariance in Extreme Event Phenomena: A Theoretical Analysis, AGU Fall Meeting, San Francisco, December 11-15, 2006.
86. Universal Pre-Disaster Transformation of Frequency-Magnitude Relation, AGU Fall Meeting, San Francisco, December 11-15, 2006.
87. Mystery of point charges, Annual meeting of the AMS, New Orleans, January 5-8, 2007.
88. Non-algebraic dessins d'enfants and eigenfunctions of anharmonic oscillators. Workshop on Real Algebraic Geometry, Oberwolfach, Germany, March 11-17, 2007.
89. Earthquakes: an introduction. Kinki University, Osaka, Japan, May 12, 2007
90. Some mathematical problems related to modeling of seismicity. Osaka, Japan, May 12, 2007
91. Multiplicity of a Noetherian intersection and degree of nonholonomy. Nihon University, Tokyo, Japan, May 16, 2007
92. Mystery of point charges. Hokkaido University, Sapporo, Japan, May 21, 2007
93. Wronski map, Schubert calculus, and pole placement. University, Sapporo, Japan, May 22, 2007
94. Topological complexity of semi- and sub-algebraic sets. Kyoto University, Kyoto, Japan, May 30, 2007
95. Multiplicity of a Noetherian intersection and degree of nonholonomy. Kyoto University, Kyoto, Japan, June 5, 2007
96. Predictability of extreme events in spatially distributed driven hierarchical systems. AGU Fall Meeting, San Francisco, December 10-14, 2007
97. Aftershock identification problem via the nearest-neighbor analysis for marked point processes. AGU Fall Meeting, San Francisco, December 10-14, 2007
98. Topological complexity of semi- and sub-algebraic sets. The Weizmann Inst. Of Science, Rehovot, Israel, January 15 and 22, 2008
99. Dessins d'enfants for the eigenfunctions of the quartic oscillator. Math. Dept. Colloquium, Technion, Haifa, Israel, January 28, 2008
100. Dessins d'enfants for the eigenfunctions of the quartic oscillator. Math. Dept. Colloquium, Tel Aviv University, Tel Aviv, Israel, January 31, 2008
101. Graphs, braids, and eigenfunctions of the Schrodinger operator. Bernoulli Centre, EPFL, Lausanne, Switzerland, March 25, 2008
102. Clustering analysis of seismicity and aftershock identification. Session IS67, European Geosciences Union General Assembly, Vienna, Austria, April 15-20, 2008
103. Dessins d'enfants for the eigenfunctions of the quartic oscillator. Workshop on "Effective real analytic geometry", ICMS, Edinburgh, UK, May 5-9, 2008
104. Approximation by monotone families of compact sets and topological complexity of the sets definable in o-minimal structures. Geometry seminar, Math. Dept., Univ. Savoy, Chambéry, France, May 30, 2008
105. Approximation by monotone families of compact sets and topological complexity of the sets definable in o-minimal structures. Workshop on "Enumeration and bounds in real algebraic geometry", Bernoulli Centre, EPFL, Lausanne, Switzerland, April 21-25, 2008
106. Dessins d'enfants for the eigenfunctions of the Schrodinger operator. "Around Hilbert's 16th Problem" Conference in honor of Jean Jacques Risler, IMPA, Rio de Janeiro, August 4-8, 2008.

107. Approximation of constructible sets by monotone families of compact sets. Fields Institute, Toronto, ON, Canada, March 17, 2009.
108. Phase transitions in cluster dynamics. AGU Joint Assembly, Toronto, May 24-27, 2009.
109. Predictive understanding of disasters: universality of precursory phenomena. AGU Joint Assembly, Toronto, May 24-27, 2009.
110. Extreme events and their predictability in a branching diffusion model. AGU Joint Assembly, Toronto, May 24-27, 2009.
111. Multiplicity of a Noetherian intersection and degree of nonholonomy. Mini-workshop on Decidability and Effective Results in O-minimality, Fields Institute, Toronto, June 5-6, 2009.
112. Triangulation of monotone o-minimal families. Workshop on Finiteness Problems in Dynamical Systems, Fields Institute, Toronto, June 22-26, 2009.
113. Irreducibility of some spectral determinants. Spectral Theory and Geometric Analysis, Northeastern University, Boston July 29 - August 2, 2009.
114. Dessins d'Enfants for the Eigenfunctions of Anharmonic Oscillator. Session on Real and Complex Singularities, Canadian Mathematical Society Winter Meeting, Windsor, December 5-7, 2009.
115. Singular Perturbation of Polynomial Potentials and Real Spectral Loci. Analytic and Algebraic Methods in Physics IV, Prague, May 9-11, 2010.
116. Dessins d'Enfants for the Eigenfunctions of the Schrodinger equation. Geometry Seminar, University of Rennes I, France, May 26, 2010.
117. Triangulation of monotone families. Seminaire de Geometrie Algebrique Reelle, Universite de Rennes I, France, May 27, 2010.
118. Semi-monotone sets. Seminaire de Geometrie Algebrique Reelle, Universite de Rennes I, France, June 2, 2010.
119. Semi-monotone sets and triangulation of tame monotone families. Real structures on complex manifolds : achievements and perspectives, Luminy, France, June 14-18, 2010.
120. Semi-monotone sets and triangulation of monotone families. Weizmann Inst. Of Science, Rehovot, Israel, December 28, 2010.
121. Singular Perturbation of Polynomial Potentials and Real Spectral Loci. Weizmann Inst. Of Science, Rehovot, Israel, January 4, 2011.
122. Semi-monotone sets and triangulation of tame monotone families. Real algebraic geometry conference, University of Rennes I, Rennes, France, June 20-24, 2011.
123. Semi-monotone sets and triangulation of tame monotone families. O-minimal structures and real analytic geometry retrospective workshop. Fields Institute, Toronto, Canada, August 8-12, 2011.
124. Eigenfunctions of the quartic oscillator and identities between elementary integrals. IUPUI Mathematics Department Colloquium, September 9, 2011.
125. Tame geometry: from subanalytic sets to o-minimal theory. Resolution of Singularities and Related Topics. In honor of the 80th birthday of H. Hironaka, Tordesillas, Spain, September 18-23, 2011.
126. On Predictive Understanding of Extreme Events: Pattern Recognition Approach; Prediction Algorithms; Applications to Disaster Preparedness. AGU Union Session "Predicting extreme events in natural and socio-economic systems: state-of-the-art and emerging possibilities", San Francisco, December 6, 2011.
127. Semi-Monotone Sets, Monotone Maps, and Triangulation of Monotone Families. Joint Mathematics Meetings, San Diego, Jan 11, 2013.

Ph.D. STUDENTS

Thierry Zell (currently at Lenoir-Rhyne University).

Thesis: Quantitative study of semi-Pfaffian sets, 2003

Monique Azar (currently at The American University of Beirut, Lebanon).

Thesis: Some lower and upper bounds in real algebraic geometry, 2008

Per Alexandersson (currently at Stockholm University).

Lic. Thesis: On eigenvalues of the Schrödinger operator with a complex-valued polynomial potential, 2011. Thesis: Combinatorial Methods in Complex Analysis, 2013.