

# CV

Alexander Volberg

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## Education

- Leningrad (St. Petersburg) University.
- Doctor of Science, V.A. Steklov Math. Institute, 1989

## POSITIONS:

- 1977 – 1988; Leningrad Institute of Electrotechnical Engineering (Assist.prof.).
- 1988 – 1989; Leningrad branch of V.A.Steklov Math.Institute (Researcher).
- September 1991 – 2000; Full Professor - Michigan State University.
- 2001—now; Distinguished Professor - Michigan State University.
- Spring Quarter, 1997 ; Visiting Professor - Caltech.
- Fall semester, 1997; Visiting Research Professor - MSRI, Harmonic Analysis Program.
- June of 1999, Visiting professor, Schrödinger Inst. for Math. Physics, Vienna.
- June of 2000, Visiting professor, Univ. Bordeaux I.
- May of 2001; Visiting professor - Stanford University.
- 2001-2003, Professor, University Paris VI.
- Spring 2004, member of the IAS, Princeton.
- Fall 2004, visiting research professor IPAM, UCLA.
- Spring 2005, visiting research professor, MSRI, Berkeley.
- Lars Onsager Professor (visiting), Norwegian University of Science and Technology, Trondheim, June-August 2005.
- E. Whittaker Professor of Math. Sciences, Univ. of Edinburgh, Scotland, 2007–2008.

## DISSERTATION:

- Asymptotically holomorphic functions and their applications.30.11.1989, Leningrad, Leningrad branch of V.A. Steklov Math.Institute

## HONORS:

- Prix Salem: Le prix international de mathématiques, en hommage à la mémoire de Raphael Salem et à son oeuvre mathématiques, a été decerné en 1988 à A. Volberg. Le jury était composé de MM. les Professeurs V. Havin, Y. Katznelson, Y. Meyer, E. Stein.
- invited speaker at ICM-90 in Kyoto, Japan. The talk: “Asymptotically holomorphic functions and their use in analysis”.
- invited 1 hour address, AMS Central Region Meeting, Detroit, MI, May 1997.
- invited Karl Strömberg lecture, Kansas State Univ., Manhattan, Kansas, Sept. 1998.
- Distinguished Faculty Award, College of Natural Science, MSU, 2000.
- LARS ONSAGER medal, Norwegian University of Science and Technology, 2005.

#### **INVITED SPEAKER OR RESEARCHER RECENTLY:**

- Invited speaker to Conference in Math. Analysis and Applications honoring Lars Hedberg, Linköping, Sweden, 1996.
- Visiting Professor, Caltech, Spring quarter, 1997.
- Research professorship, Harmonic analysis semester, Berkeley, MSRI, Fall 1997.
- Invited speaker at Satellite to ICM: Geometric methods in Fourier and Functional Analysis, Kiel, Germany, August 1998.
- Invited speaker at Meeting of London Math. Soc., London, Oct. 16-17, 1998.
- Visiting researcher, Erwin Schrödinger Institute, Vienna, Austria, June 1999, April 2003.
- Invited speaker at International Workshop on Operator Theory, Bordeaux, France, June 2000.
- Invited lecturer at Satellite conference to European Congress of Mathematicians, El Escorial, Spain, August 2000.
- Invited lecturer at Paseky summer school in Analysis, Czech Republic, June 2000.
- Invited speaker at International Conference on Harmonic Analysis, Heat kernel and PDE, Paris, 2001.
- Invited speaker at International Workshop on Operator Theory, Blacksburg, VA, 2002.
- Invited lecturer at NSF CBMS Conference at Chapel Hill, NC, 2002.
- invited speaker, 19 Nevanlinna Colloquium, Jyväskylä, Finland, June 2003.

- invited lecturer at Harmonic Analysis and PDE trimester, Scuola Normale Superiore de Pisa, Sept. 2003, June 2004.
- invited lecturer at Harmonic Analysis conference, Osaka Nov. 2004.
- invited speaker at Harmonic Analysis and Geometric Measure Theory trimester in Barcelona–Madrid, Summer, 2006.
- invited speaker at Ahlfors 100 anniversary conference, Helsinki, Aug. 2007.
- invited speaker at Complex Analysis Workshop, Fields Inst. Toronto, 2008.
- invited speaker at Harmonic Analysis Workshop, Fields Inst. Toronto, 2008.
- invited speaker at 70's anniversary of V. G. Maz'ya Conf., Rome, 2008.
- invited speaker at Hamiltonian Systems and PDE Conf., Maiori, Italy, 2009.
- invited speaker at Harmonic Analysis, GMT and Quasiconformal mappings ESF Conference, Barcelona, Spain, 2009.

**INVITED to AMS meetings:**

- 1994: Manhattan, Kansas;
- 1994: Cincinnati, Ohio;
- 1995: San Francisco, Ca.
- 1997: Milwaukee, Wisconsin;
- 1997: Albuquerque, New Mexico;
- 1997: invited 1 hour address, AMS Central Region Meeting, Detroit, MI.
- 1999: Austin, Texas;
- 2000: Washington, DC.
- 2001: Lawrence, KS.
- 2002: Madison, WI.
- 2004: Los Angeles, CA.
- 2007: Chicago, Ill.
- 2008 Washington, DC.

**GRADUATED STUDENTS:**

- Zoltan Balogh, graduated in Aug.1995. Dissertation "Metric properties of semihyperbolic repellers with application to harmonic measure".
- Now: Full Professor, Univ. of Bern, Switzerland.
- Irina Popovici, graduated in 1997.
- First job at UCLA (Univ. of California at Los Angeles), Hedrick assistant professorship.
- Now: Assoc. Professor, US Navy Academy, Annapolis, MD.
- Stefanie Petrmichel, finished in June 2000.
- First job at Princeton (IAS) followed by Tamarkin Assist. Prof. at Brown Univ.
- then tenure track assist. prof. UT Austin, TX.
- now full professor, Univ. of Toulouse, France.
- Oliver Dragicevic, finished in 2003. First job: Postdoctoral position at Scuola Normale Superiore de Pisa.
- now assist. prof. Univ. of Ljubljana.
- Leonid Slavin, finished May 2004, Dissertation "Bellman functions and BMO". First job: PostDoc at the Univ. of Connecticut.
- then postdoc at the Univ. of Missouri, Columbia. Now assist prof. at the Univ. of Cincinnati.
- started: Matt Bond, Nick Boros, Nikolaos'Pattakos, Alexander Reznikov.

#### **NSF GRANTS:**

- 1991-1992. DMS 9101788. Asymptotically holomorphic functions. Joint with J.E.Brennan.
- 1993-1995. DMS 9302728. Three measures on fractals.
- 1996-1998. DMS 9622936. Operator approach to problems in analysis and probability: Matrix Muckenhoupt weights, Hankel and Toeplitz operators, the angle between past and future. Joint with S.R.Treil.
- 1999-2001. DMS 9970395. Nonhomogeneous harmonic analysis with applications to probability, analytic capacity and Geometric Measure Theory. Joint with S. Treil, F. Nazarov.
- 2002-2005. DMS 0200713. Multidimensional and Non-Homogeneous Harmonic Analysis: Bellman Functions, Perturbations of Normal Operators and Two Weight Estimates of Singular Integrals. Joint with S. Treil, F. Nazarov.

- 2005-2007. DMS 0501067. Calderón-Zygmund operators in hostile environment with applications to Operator theory and spectral theory of Schrödinger operator.
- 2007-2012. DMS 0755852. Bellman functions, Harmonic Analysis, Geometric Measure Theory.

#### **OTHER GRANTS:**

- Binational Israeli-USA grant, 1997-1999, Hilbert transform and approximation in Analysis and Probability. Joint with A. Atzmon, V. Matsaev, F. Nazarov, M. Sodin, S.R. Treil.

#### **PUBLICATIONS of Alexandre Volberg. 1978-1983 publications**

1. Mean square completeness of polynomials beyond the scope of a theorem of Szegő. Dokl. Akad. Nauk SSSR, 1978, v.241, 3, 521-524 (in Russian). English translation in Sov. Math. Dokl., 1978, 19, 4, 877-881.
2. Simultaneous approximation by polynomials on the circle and in the disc. Zap. nauchn. semin. LOMI, 1979, v.92, 60-84 (in Russian).
3. Thin and thick families of rational fractions. Lect. Notes in Math. 1981, v.864, pp. 440-480.
4. Density of rational fractions in weighted  $L_{subp}$  spaces on the circle. Funk. Anal. i ego Pril., 1981, v.15, 2, 69-70 (in Russian). English translation in Funct. Anal. and its Appl., 1981, 15, 2, 130-131.
5. The comparison of integral norms on the subspaces of pseudoextendible functions. Uspekhi Matem. Nauk, 1981, v.36, 6, 205-206 (in Russian)
6. Two remarks concerning the theorem of S. Axler, S.-Y. Chang and D. Sarason. J. of Operator Theory, 1982, v.8, pp. 209-218.
7. (with S.V. Khrushchev). A generalization of Koosis-Lax interior compactness theorem. J. of Operator Theory, 1982, v.8, pp. 197-208.
8. The logarithm of an almost analytic function is summable (in Russian). English translation in Soviet Math. Dokl., 1982, v.26, 1, pp. 238-243.

#### **1983-1987 publications**

9. Denseness of the polynomials on the system of rays (in Russian). English translation in Soviet Math. Dokl., 1984, v.29, 2, pp. 342-347.
10. (with S.V. Konyagin). On every compact in  $R^n$  there is a homogeneous measure (in Russian). Dokl. Akad. Nauk, SSSR, 1984, v.278, 4, 783-788. English translation in Sov. Math. Dokl., 1984, 30, 2, 453-457.
11. (with V.A. Tolokonnikov). Some remarks concerning the multipliers of the Cauchy type integral and the algebras of Sarason. Funk. Anal. i ego Pril., 1984, v. 18, 2, 61-62. English translation in Funct. Anal. and its Appl., 1984, 18, 2, 137-138.
12. A constructive proof of a Marshall-Chang theorem (in Russian). Zap. Nauchn. Semin. LOMI. 1985, v. 141, 149-153.

13.(with V.A. Tolokonnikov). Hankel operators and the problems of best approximation of unbounded functions (in Russian)., Zap. Nauchn.Semin. LOMI, 1985, v.141, 5-17.

14.(with S.R. Treil).Embedding theorems for the invariant subspaces of the backward shift operator. Zap. Nauchn. Semin. LOMI, 1986, v.149, 38-51 (in Russian)

15.(with N.G. Makarov). On the harmonic measure of discontinuous fractals. LOMI preprint, E-6-86, pp. 1-34.

### **1987-1990 publications**

16.(with O.V.Ivanov) Membership of the product of two Hankel operators in Schatten-von Neuman class. Dokl. Acad. Nauk. Ukrain, Ser. A, 1987, No. 4, pp.3-6.

17.(with B. Joricke). The summability of logarithm of an almost analytic function and a generalization of the Levinson-Cartwright theorem. Matem. Sb., 1986, v.130, 3, 335-348 (in Russian). English translation in Math. USSR Sb., 1987, 58, 2, 337-349.

18.(with S.V. Konyagin). On the measures with doubling condition. Izv.Akad. Nauk. SSSR, 1987, v.51, 3, 666-675 (in Russian). English translation Math. USSR-Izv. 30 (1988), no. 3, 629-639.

19.(with B.M. Solomyak). Multiplicity of spectrum of Toeplitz operators, weighted cocycles and the vector Riemann-Hilbert problem. Funk. Anal. i ego Pril., 1987, v. 21, 3, 1-10 (in Russian). English translation in Funct. Anal. and its Appl., 1987, 21, 3, 175-182.

20.(with B.M. Solomyak). Multiplicity of spectrum of Toeplitz operators. Oper. Theory: Adv. Appl., 1989, v. 42, pp 87-192.

21.The Lojasiewicz inequality for very smooth functions. Soviet Math. Dokl., 1990, v.41, 1, pp.170-174.

22.A criterion on a subdomain of the disc to have its harmonic measure comparable with Lebesgue measure. Proc. Amer. Math. Soc., 1991, v.112, 1, pp. 153-162. 23.How to break in a prescribed contour? LOMI preprint, P-1-89 (in Russian).

24.Weighted polynomial approximation in simply connected domains. LOMI preprint, P-2-89 (in Russian).

25.(with A.A. Borichev). Uniqueness theorems for almost analytic functions. Algebra and Analysis, 1989, v.1, 1, 146-177 (in Russian). English Translation in Leningrad J. of Math., 1990, v.1, No. 1.

26.Un theoreme de Dulac-Ecalle-Illyashenko-Martinet-Moussu-Ramis etendu aux fonctions quasianalytiques. Publ. Mathematique d'ORSAY, Semin. d'Analyse Harmonique, 1990 (in French).

27.(with N.K. Nikolski) Tangential and approximate free interpolation. Analysis and PDE. Lecture Notes in Pure and Applied Math. v. 122, pp. 277-299 Dekker, Ne York, 1990.

### **1991-1994 publications**

28.(with V. Peller, Dm. Yakubovich). A brief excursion to a theory of hyponormal operators. Algebra and Analysis, 1990, v.6. (in Russian). English Translation in Leningrad Math. J. 1991, v. 2, No. 2, pp. 211-243.

29. On the harmonic measure of self-similar sets on the plane. in Harmonic Analysis and Potential Theory, ed. M.A.Picardello, Plenum Press; New York, London 1992.

30.(with M.Yu. Lyubich). A comparison of harmonic and maximal measure for rational functions. Proc. of the NATO Research Workshop on “Approx. by Solutions of Partial Differential Equations, and Related Topics”, ed. B.Fuglede, M.Goldstein, W.Hausmann, W.K. Hayman, L.RoggeKluwer Ac. Publ., NATO ASI Series, Ser C, Vol. 365, 1992.

31.On the dimension of harmonic measure of Cantor repellers. Michigan Math. J., 1993, v. 40, pp. 239-258.

32.Asymptotically holomorphic functions and their applications. Proc. of the International Congress of Mathematicians 1990, Kyoto, Japan.

33.(with P.P. Kargaev). Three results concerning the support of functions and their Fourier transforms. Indiana Univ. Math. J., 1992, v.41, No. 4, pp. 1143-1164.

34.Review of the books J.W.Helton . OPERATOR THEORY, ANALYTIC FUNCTIONS, MATRICES, and ELECTRICAL ENGINEERING. CBMS Reg. Conf. Series in Math, V.68, Amer Math Soc, 1987. and Bruce A. Francis . A COURSE in  $H^\infty$  CONTROL THEORY. Lect. Notes in Control and Information Sciences. Vol. 88, Springer, 1987.-in Leningrad Math. J., 1992, v. 3, No. 3.

35. Rapidly growing functions with empty spectrum and a gap in the support. St. Petersburg Math. J., 1993, v.5,3, pp.77-99.

36. (with L. Bialas) Markov’s inequality on Cantor-like sets. Studia Math., 1993, 104, 3, pp.259-268.

37. (with S.Treil) Nehari-type theorems in weighted  $l^2$ -spaces via fixed point theorems. Operator Theory: Advances and Applications, v.71, 1994, pp.165-186.

38. (with Zoltan Balogh) Principe de Harnack a la frontiere pour des repulseurs holomorphes non recurrents. C. R. Acad.Sci. Paris, v.319, 1994, p. 311-314.

### 1995-2004 publications and preprints

39.Markov’s inequality for Cantor repellers: Topics on Complex analysis. *Banach Center Publ.*, **31**, (1995), pp. 383-391. Proceedings of the conference on Complex Dynamics.

40.(with M.Yu. Lyubich). A comparison of harmonic and maximal measures on Cantor repellers. *J. of Fourier Analysis and Applications*, **1**, (1995), pp.379-399. Volume in honor of J. P. Kanane.41.

(with R.Younis and D.Zheng) Subalgebras of  $C(M(H^\infty))$ . *Proc.AMS*, **123**, (1995), no. 2, 367-371.

42. (with A.A. Borichev) Finiteness of limit cycles and uniqueness for asymptotically holomorphic functions. *St. Petersburg Math. J.*, **7**, (1996), no. 3, pp.343-368.

43. (with Zoltan Balogh) Normalization of almost conformal parabolic germs. *Ann. Acad. Sci. Fenn.*, Ser. A, Math., **20**, (1995), No.1, 109-121.

44. (with Zoltan Balogh) Geometric localization, uniform John properties, and separated semihyperbolic dynamics. *Arkiv für Mat.*, **34** (1996), no. 1, 21-49.

45. (with Zoltan Balogh) Boundary Harnack principle on separated semihyperbolic repellers. Harmonic measure applications. *Revista Mathematica Iberoamericana*, **12** (1996), 299-336.

46. (with Z.Balogh and I. Popovici) Conformally maximal polynomial-like dynamics and invariant harmonic measure. *Ergodic Theory and Dynamical Systems.*, **17** (1997), 1-27.

47. (with S.R.Treil) Weighted embeddings and weighted norm inequalities for the Hilbert transform and the maximal operator. *St. Petersburg Math. J.* **7** (1995), 205-226.
48. (with M.Urbanski) A rigidity result for holomorphic dynamics. *Progress in Probability*, **37**, (1995), 180-187, Birkhauser Verlag.
49. (with I.Popovici) Rigidity of harmonic measure. *Fundamenta Math.*, **150**, (1996), 237-244.
50. (with I.Popovici) Dimension of harmonic measure on the Julia set of one-petal Blaschke products. *Algebra i Analysis* **9** (1997), no. 3, 150-197. In English *St. Petersburg Math. J.* **9** (1998), 130-180.
51. (with D.Zheng and S.Treil) Hilbert transform, Toeplitz operators and Hankel operators, and invariant  $A_\infty$  weights. *Revista Mat. Iberoamericana*, **13**, (1997), no.2, 319-360.
52. (with S.R. Treil) Wavelets and the angle between past and future. *J. of Funct. Analysis*, **143** (1997), no. 2, 269-308.
53. Matrix  $A_p$  condition via  $S$ -functions. *J. of Amer. Math.Soc.*, **10** (1997), no.2, 445-466.
54. (with F.Nazarov and S.Treil) Counterexample to infinite dimensional Carleson embedding theorem. *Comptes Rendus Ac. Sci. Paris, Sér. I Math.*, 1997, t. **325**, no. 4, 383-388.
55. (with F.Nazarov and S.Treil) Cauchy integral and Calderon-Zygmund operators on nonhomogeneous spaces. *IMRN Intern. Math. Res. Notes.*, **1997**, no. 15, 703-726.
56. (with S.Treil) Continuous frame decomposition and vector Hunt–Muckenhoupt–Wheeden theorem. *Arkiv für Math.*, **35** (1997), no. 2, 363-386.
57. (with I.Popovici) A. Boundary Harnack principle for Denjoy domains. *Complex Variables Theory Appl.* **37**, (1998), no. 1-4, 471–490.
58. (with F. Nazarov, S.Treil) Weak type estimates and Cotlar inequalities for Calderón-Zygmund operators in nonhomogeneous spaces. *IMRN Intern. Math. Research Notices*, **1998**, no. 9, 463-487.
59. (with S.Treil) Completely regular multivariate stationary processes and Muckenhoupt condition. *Pacific J. Math.*, **190**, (1999), no. 2, pp. 361-382.
60. (with K.Baranski and A.Zdunik) The solution of Brennan’s conjecture for Fatou sets of quadratic polynomials. *IMRN Intern. Math. Research Notices*, **1998**, no. 12, 589-600.
61. (with F. Nazarov, S. Treil) Bellman function and two-weight inequality for martingale transform. *J. of Amer. Math.Soc.*, **12**, (1999), no. 4.
62. (with J. Esterle) Analytic left invariant subspaces and asymptotically holomorphic functions. *Comptes Rendus Acad. Sci. Paris, Série I*, **326**, 1998, p. 295-300.
63. (with J. Esterle) Asymptotically holomorphic functions and translation invariant subspaces of weighted Hilbert spaces of sequences, I. *J. of Operator Theory* 2000.
64. (with J. Esterle) Asymptotically holomorphic functions and translation invariant subspaces of weighted Hilbert spaces of sequences, II. *Ann. Sci. Ecole Norm. Sup.*, 2002.
65. (with S. Hukovic, S. Treil) Bellman functions and sharp weighted estimates for the square functions. *Complex analysis, operators, and related topics (in memory of S.A.Vinogradov)*, pp. 97–113, *Oper. Theory Adv. Appl.*, **113**, Birkhauser, Basel, 2000.

- 66.(with A. Gillespie, S. Pott, S. Treil) Logarithmic growth for matrixmartingale transform. Preprint Schrödinger Institute, 719 (1999) pp.1-12. See the homepage: <http://www.math.msu.edu>. London Math. Soc. (2001)
- 67.(with A. Gillespie, S. Pott, S. Treil) A transference approach to estimates of vectorial Hankel operators. *St. Petersburg Math. J.*, **12**, (2001), no. 6.
- 68.(with G. Pisier, F. Nazarov, S. Treil) Sharp estimates for noncommutative Carleson embedding theorem and vector Hankel operators. *J. für die reine und angew. Math.*, v. 542, 2002.
- 69.(with St. Petermichl) Heating the Beurling operator: weakly quasiregular maps on the plane are quasiregular. See the homepage <http://www.math.msu.edu/volberg>*Duke Math. J.*, v. 112, No. 2, 2002.
- 70.(with F. Nazarov and S. Treil) Accretive system  $Tb$  theorems for nonhomogeneous spaces. See the homepage <http://www.math.msu.edu/volberg>*Duke Math. J.*, v. 113, No. 3, 2002, pp. 259-312.
- 71.(with F. Nazarov and S. Treil) Bellman function in Stochastic optimal Control and Harmonic Analysis (how our Bellman function got its name.) See the homepage <http://www.math.msu.edu/volberg>*Theory Adv. Appl.*, **129**, Birkhauser, Basel, 2002.
- 72.(with F. Nazarov) Bellman function, two weight Hilbert transform and imbedding for the model space  $K_\theta$ . Volume in the memory of Tom Wolff. *J. d'Analyse Math.*, v. 87, 2002, 385-412,
- 73.(with P. Yuditskii) On the inverse scattering problem for Jacobi matrices with the spectrum on an interval, several intervals or a Cantor set of positive length.*Commun. in Math. Physics*, v. 226, (2002), pp. 567-605.
- 74.(with C. Finet and H. Queffelec) Composition operators in Dirichlet spaces, their smoothness and their numerical range.*Comptes Rendus de l'Acad. des Sciences*, v. 335, No. 4, (2002), 325-328.
- 75.(with S. Petermichl and S. Treil) Riesz transforms are averaging of dyadic shifts.*Publ. Mat.*, 2002, pp. 209-229, Proc. of the 6th Conference on Harmonic Analysis and Partial Differential Equations at El Escorial, ed. Patricio Cifuentes, Jose Garcia-Cuerva, Eugenio Hernandez, Fernando Soria, Jose Luis Torrea, and Anna Vargas.
76. (with F. Nazarov, M. Sodin) The geometric Kannan-Lovász-Simonovits lemma, dimension-free estimates for volumes of sublevel sets of polynomials, and distribution of zeroes of random analytic functions. I.*St. Petersburg Math. J.* **14** (2003) no. 2, 1-15.
- 77.(with F. Nazarov, M. Sodin) The geometric Kannan-Lovász-Simonovits lemma, dimension-free estimates for volumes of sublevel sets of polynomials, and distribution of zeroes of random analytic functions. II.*Israel J. Math.*, (2003), no. 2.
- 78.(with F. Nazarov) Heating the Beurling operator and estimates of its norms. *St. Petersburg Math. J.* **14** (2003) no. 3.
- 79.(with O. Dragicevic) Sharp estimates of the Ahlfors-Beurling operator via averaging of Martingale transform. *Michigan Math. J.* **51** (2003), 415-435.
- 80.(with A. Borichev and H. Hedenmalm) Zero free invariant subspaces in large Bergman spaces. *J. Funct. Analysis*, **207**, (2004), 111-160.
- 81.(with F. Nazarov and S. Treil)  $Tb$  theorems for nonhomogeneous spaces. See the homepage <http://www.math.msu.edu/volberg>

- Acta Mathematica, v. 190 (2003), pp. 151-239.
82. Factorization of polynomials with estimates of norms.  
Operator Theory: Advances and Applications, v. 149, 2004, pp. 277-295.
- 83.(with F. Nazarov, F. Peherstorfer, P. Yuditskii) On generalized sum rules on Jacobi matrices.  
Intern. Math. Research Notices., 2005, No.3, 155–186.
84. (with O. Dragicevic) Bellman function for the estimates of Littlewood-Paley type and asymptotic estimates in the  $p - 1$  problem.  
C. R. Math. Acad. Sci. Paris 340 (2005), no. 10, 731–734.
- 85.(with P. Yuditskii and F. Peherstorfer) Limit periodic Jacobi matrices with a prescribed  $p$ -adic hull and a singularly continuous spectrum .  
Preprint: arXiv:math.SP/0408259 Math. Res. Lett. 13 (2006), no. 2-3, 215–230.
- 86.(with O. Dragicevic) Bellman function, Littlewood-Paley estimates and asymptotics for the Ahlfors-Beurling operator in  $L^p(C)$ .  
Indiana Univ. Math. J. 54 (2005), no. 4, 971–995.
87. On a theorem of Videnskii-Shirokov.  
Harmonic analysis and its applications, 91–97, Yokohama Publ., Yokohama, 2006.
- 88.(with O. Dragicevic) Bellman function and dimensionless estimates of classical and Ornstein-Uhlenbeck Riesz transforms.  
J. of Oper. Theory, v. 56 (2006) No. 1, pp. 167-198.
- 89.(with F. Nazarov and P. Yuditskii)  
Asymptotics of orthogonal polynomials beyond the scope of the theorem of Szegő–Kolmogorov-Krein.  
Math. Research Letters, to appear.
90. (with V. Vasyunin)  
Bellman function for a two weight inequality: the case study.  
Algebra i Analiz 18 (2006), no. 2, 24–56.
91. (with F. Nazarov, M. Sodin)  
Transportation to random zeroes by the gradient flow.  
Accepted: GAFA (Geometric and Functional Analysis).
92. (with O. Dragicevic) A rotation method which gives linear  $L^p$ -estimates for powers of the Ahlfors-Beurling operator.  
Journal des Mathématiques Pures et Appliquées, v. 86, No. 6 (2006), 492-509.
93. (with P. Yuditskii) Noncommutative Perron-Frobenius-Ruelle theorem two weight Hilbert transform, and almost periodicity.  
Preprint: arXiv:math.SP/040825796.  
To appear J. Funct. Analysis.
94. (with A. Kiselev, F. Nazarov)  
Global solvability of critically dissipative quasi-geostrophic equation.  
Inventiones Math., v. 167, No. 3, (2007), 445-453.
- 95.(with F. Nazarov, S.Treil)  
Two weight estimate for the individual Martingale transform and other well localized operators. Math Research Letters. 2008.

96. (with F. Nazarov, P. Yuditskii)  
Asymptotics of orthogonal polynomials in the presence of singular measure. *Math. Research Letters*. 2008.
97. (with F. Nazarov, Y. Peres)  
The four-corner Cantor set and a power law for the Buffon needle probability, *St. Petersburg Math. J.* 2009
98. (with M. Melnikov, A. Poltoratskii)  
Uniqueness theorems for the Cauchy integrals and Geometric Measure Theory. *Publ. Mat*, 2008.
99. (with F. Peherstorfer, P. Yuditskii)  
CMV matrices with asymptotically constant coefficients. Szegő over Blaschke class, *Scattering Theory, J. of Funct. Analysis*, 2009.
100. (with V. Eiderman, F. Nazarov)  
Hausdorff content of sets with large values of vector Riesz potentials. Estimates from above. Preprint 2007, pp. 1-26.
101. (with V. Vasyunin)  
Monge–Ampère equation and Bellman optimization of Carleson Embedding Theorem. *Advances in Math. Sciences, AMS, Ser. 2, v. 2226 (2009)*, pp. 195–238.
102. (with P. Yuditskii)  
Remarks on Nehari’s problem, matrix  $A_2$  conditions, and weighted bounded mean oscillation. *Advances in Math. Sciences, AMS, Ser. 2, v. 2226 (2009)*, pp. 239–254.
103. (with S. Mayboroda)  
Square function and Riesz transform in non-integer dimensions. To appear in *Comptes Rendus Ac. Sci. Paris*, 2009.
104. (with S. Mayboroda)  
Boundedness of the square function and rectifiability. To appear in *Comptes Rendus Ac. Sci. Paris*, 2009.
105. (with F. Nazarov)  
On analytic capacity of portions of continuum and a theorem of Guy David. Preprint Schrödinger Institute, 718 (1999) pp.1-11. *Surveys in Math. Studies, Proc. of the Conf. in honor of V. G. Maz’ya*.
106. (with Fedor Nazarov, Mikhail Sodin)  
Transportation to random zeroes by the gradient flow. *GAF*, 2008.
107. (with F. Nazarov, F. Peherstorfer and P. Yuditskii) Asymptotics of the best polynomial approximation of  $|x|^p$  and of the best Laurent polynomial approximation of signum function on two symmetric intervals *Constr. Approx.* (2009) 29; 23-39
108. (with Leonid Slavin)  
Bellman Function and the  $H^1 - BMO$  Duality, *Contemporary Math*, 428, AMS, 2007
109. (with Oliver Dragicevic’, Sergei Treil)  
A theorem about three quadratic forms *Intern Math. Research Notices*, 2009.
110. (with F. Nazarov, M. Sodin)  
The Jancovici - Lebowitz - Manificat law for large fluctuations of random complex zeroes *J. of Statistical Physics*, 2009.

## A small book

1. “Calderón-Zygmund Capacities and Operators on Nonhomogeneous Spaces”  
CBMS Regional Conference Series in Mathematics, v. 100, 2003, pp. 1-167.

## Preprints

### Some preprints

- 1.(with F. Nazarov and S. Treil) On a ”crazy”  $Tb$  theorem.  
Preprint no. 519, CRM, Univ. Auton. de Barcelona, 2002, pp. 1-84.
2. arXiv:0905.0207 [ps, pdf, other] Title: Buffon needles landing near Sierpinski gasket Authors: Matthew Bond, Alexander Volberg Comments: 28 pages Subjects: Classical Analysis and ODEs (math.CA); Combinatorics (math.CO)
4. arXiv:0811.1302 [ps, pdf, other] Title: Estimates from below of the Buffon noodle probability for undercooked noodles Authors: Matthew Bond, Alexander Volberg Comments: 10 pages Subjects: Analysis of PDEs (math.AP); Complex Variables (math.CV)
5. arXiv:0807.2953 [ps, pdf, other] Title: An estimate from below for the Buffon needle probability of the four-corner Cantor set Authors: Michael Bateman, Alexander Volberg Comments: 11 pages, one figure Subjects: Classical Analysis and ODEs (math.CA); Analysis of PDEs (math.AP)
6. arXiv:0801.1855 [ps, pdf, other] Title: Vector-valued Riesz potentials: Cartan type estimates and related capacities Authors: V. Eiderman, F. Nazarov, A. Volberg Comments: 33 pages Subjects: Analysis of PDEs (math.AP)
7. arXiv:0711.2460 [ps, pdf, other] Title: Linear dimension-free estimates for the Hermite-Riesz transforms Authors: Oliver Dragicevic, Alexander Volberg Comments: 44 pages; improvements of the main results (as compared to the previous version); Subjects: Classical Analysis and ODEs (math.CA)
8. arXiv:0711.0948 [ps, pdf, other] Title: Reflectionless measures with a point mass and singular continuous component Authors: F. Nazarov, A. Volberg, P. Yuditskii Subjects: Mathematical Physics (math-ph); Complex Variables (math.CV)
9. Title: Sharp estimates of martingale transforms in higher dimensions and applications to the Ahlfors-Beurling operator Authors: Oliver Dragicevic, Stefanie Petermichl, Alexander Volberg Comments: 41 pages, 12 figures