

# CV and full publication list

Alexander Volberg

**blog:** <http://sashavolberg.wordpress.com>

## Education

- St. Petersburg (Leningrad) University, St. Petersburg, Russian Federation.
- PhD, Steklov Math. Institute, Russian Academy of Science, 1982, advisor: Nikolai K. Nikolski
- Doctor of Science, Steklov Math. Institute, Russian Academy of Science, 1988

## POSITIONS:

- 1978–1982; Leningrad Institute of Electrotechnical Engineering (Junior researcher).
- 1982 – 1988; Leningrad Institute of Electrotechnical Engineering (Assistant professor).
- 1988 – 1994; St. Petersburg branch of Steklov Math. Institute, Russian Academy of Science, (Senior Researcher).
- September 1990 –2003; Full Professor - Michigan State University.
- Spring 2005; E. Whittaker Chair in Math. Sciences, Univ. of Edinburgh.
- September 2003 –now; Distinguished University Professor - Michigan State University.
- September 2014–now; MSU foundation professor.

## HONORS:

- Salem Prize, Prix Salem: Le prix international de mathématiques, en hommage à la memoire 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.
- Distinguished Professorship, MSU, 2003-now.

- Lars Onsager medal, Norwegian University of Science and Technology, 2005.
- Alexander von Humboldt Forschungspreise (Research Award), 2011, Alexander von Humboldt Foundation, Germany.
- Rubio de Francia Memorial Lecture, University Autónoma de Madrid, May 2011.
- MSU foundation professor, from Sept. 2015.
- Clay senior research scholarship, Spring 2017.
- Simons professorship (MSRI semester), Spring 2017.

- **Visiting Positions:**

- Spring Quarter, 1997 ; Visiting Professor - Caltech.
- Fall semester, 1997; Research Professor - MSRI, Harmonic Analysis Program.
- May of 2001; Visiting professor - Stanford University.
- Spring 2004, member of the IAS, Princeton.
- Fall 2004, visiting research professor IPAM, UCLA.
- Spring 2005, visiting research professor, MSRI, Berkeley.
- Lars Onsager Professor, Norwegian University of Science and Technology, Trondheim, June-August 2005, June-August 2006.
- May of 2009, Visiting professor, Univ. de Provence, Marseille, France.
- March–May 2010, visiting professor, Univ. of Sevilla, Spain.
- Jan. 2011–March 2011 member of MSRI, Berkeley, CA.
- April 2011–June 2011 fellow of Newton Inst., Cambridge, UK.
- August 2011–May 2012 Research Professorship at MSRI, Berkeley, CA.
- Clay senior research scholarship, Spring 2017.

**INVITED SPEAKER OR RESEARCHER, SELECTED ITEMS:**

- invited speaker at ICM 1990, Kyoto, Japan.
- Invited speaker to Conference in Math. Analysis and Applications honoring Lars Hedberg, Linkoping, 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 (IWOTA), Blacksburg, VA, 2002.
- Invited lecturer at NSF CBMS Conference at Chapel Hill, NC, 2002.
- invited speaker, 19 Nevanlinna Colloquium, Jyväskylä, Finland, June 2003.
- invited speaker, Vitushkin's 75th anniversary conference, Moscow, 2003
- Invited lecturer at Harmonic Analysis and PDE trimester, Scuola Normale Superiore de Pisa, September 2003 and 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 100th anniversary conference, Helsinki, Aug. 2007.
- invited speaker at Maz'ya 70th anniversary conference, Rome, Summer, 2008.
- invited speaker at Harmonic Analysis trimester in Fields Inst., Toronto, Canada, January 2009 and March 2009.
- invited speaker at Harmonic Analysis and Geometric Measure Theory conference in Barcelona, Summer, 2009.

- Invited lecturer at the Winter school in Analysis, Univ. of Bonn, Germany, Feb. 1–5, 2010.
- Invited lecturer at the Steklov Math. Inst., April. 10–15, 2010.
- Invited lecturer at the Summer school in Analysis and Operator Theory, Univ. de Seville, El Puerto de Santa Maria, June, 2010.
- Invited lecturer at the Semester on New directions in Fluid Dynamics and Harmonic Analysis, Madrid, Nov. 4–14, 2010.
- visiting researcher, MSRI program in Free boundary problems, Theory and Applications, MSRI, Berkeley, CA, January–March, 2011.
- visiting researcher, program on Discrete Analysis, Newton Inst., Cambridge, GB, April–June 2011.
- August 2011–May 2012 Research Professorship at MSRI, Berkeley, CA. Programs of “Quantitative Geometry” and “Spatial Random Processes”.
- invited speaker, VII-th International Conference on Elliptic and Parabolic PDE’s, Gaeta, Italy, May 2012.
- invited speaker, International Conference on Harmonic Analysis, Toulouse, France, May 2012.
- invited researcher (Humboldt Professorship), University of Bonn, June 2012.
- lecturer for middle-school children, at Marine County Math. Circle, CA, Spring, 2012.
- research in pairs at Oberwolfach Mathematical Research Institute, January, 2013.
- invited lecturer at Harmonic Analysis semester, Madrid, May-June 2013.
- invited speaker at ”Hilbert Function Spaces” Gargnano, Italy, June 2013
- invited speaker at Oslo trimester of Harmonic Analysis, April 2013
- invited speaker TexAMP 2013 conference at Rice University on October 25 - 27.
- invited speaker at workshop “Fluid Mechanics and Singular Integrals” during the week June 17-21, 2013 at the University of Seville.
- research and lecturer at Hausdorff Inst. for Mathematics, Bonn, April, May, July 2014.
- research and lecturing “F. Klein lecture series” at Max Plank Institute, Leipzig, June 2014.
- researcher and lecturer at the Newton Institute, Cambridge, 2014.

- seminar talks 2013, 2014, 2015: UC Berkeley, UCLA, MSU, Kent State University, Brown University, U. of Chicago (Zygmund's seminar), Kings College, London.
- colloquium talks: U. of Lissabon, USF, University of Miami, Indiana University (Bloomington), Vanderbilt University.
- invited speaker at "Recent advances in non-local and non-linear analysis", June 10 - 14, 2014, ETH Zurich.
- research in pairs, Hausdorff Institute, Bonn, May 2015.
- research in pairs, Institute Henri Poincaré, Paris, June 2015.
- invited speaker at CBMS conference in Fargo, N. Dakota, July 2015.
- research in pairs, Hausdorff Institute, Bonn, June 2016.
- research in pairs, Oberwolfach Institute, Oberwolfach, Jan 18–March 12, 2016.
- invited speaker conference in honor of 60th birthday of N. G. Makarov "Everything is Complex", Saas-Fee, Switzerland, March 2016.
- colloquium talk, University of Michigan, Ann Arbor, Nov. 2015.
- colloquium talk, SUNY, Stony Brook, April 2016.
- invited speaker, conference in honor of 60th birthday of M. Christ, Madison, U. of Wisconsin, May 2016.
- invited speaker, workshop "Singular Integrals and PDE", Helsinki, May 2016, <http://wiki.helsinki.fi>
- research in pairs, Hausdorff Institute, Bonn, June 2016.
- Clay senior research fellow, MSRI, Spring 2017
- Simons professor, MSRI, Spring 2017

**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. 2010: Providence, RI. 2010: Los Angeles, CA. 2011: Syracuse, NY. 2012: Honolulu, HI. 2013 joint USA-Romania meeting.

### **Participate in organizing and lecturing**

- 10 lectures at NSF CBMS Conference at Chapel Hill, NC, 2002.
- Fall school at lake Arrowhead (with Christoph Thiele), CA, Oct. 2010.

- AMS section meeting at Los Angeles (with Christoph Thiele), CA, Oct. 2010.
- American Institute of Mathematics: Workshop on weighted singular integrals (with Maria Reguera and Svitlana Mayboroda), Oct. 2011, Palo Alto, CA.
- Summer School in Antibes, France (with Laurent Barachard and Vasily Vasyunin), June 2011.
- Summer School in Mittag-Leffler Institute, Stockholm, Sweden (with Håkan Hedemalm and Vasily Vasyunin), July, 2012.
- Summer school at University of Bonn, 2014;
- Summer school at “Mathematics of the planet Earth”, Santander, Spain, 2014.
- Internet Analysis seminar lecture course, Georgia Institute of Tech., 2014.

#### **GRADUATE STUDENTS:**

- Zoltan Balogh, graduated in Aug.1995. Dissertation ”Metric properties of semi-hyperbolic 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 Petermichl, 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.
- in 2005 was awarded the Salem Prize for young analyst; the first woman with this honor
- Oliver Dragicevic, finished in 2003. First job: Postdoctoral position at Scuola Normale Superiore de Pisa.
- now associate 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 tenure track position at the Univ. of Cincinnati.
- Matt Bond, finished Spring 2011,
- now NSF postdoc at Univ. of British Columbia, Vancouver, Canada.
- Nick Boros, finished in May 2012, job at Olivet Nazarene University in Illinois.
- Nikolaus Pattakos, finished November, finished in 2012, first job at University of Birmingham, UK.
- graduate student: Alexander Reznikov, finished in 2014, first job Vanderbilt University.
- graduate students: Paata Ivanisvili, finished in 2015, first job Kent State Univ.
- Guillermo Rey, finished in 2015, first job at Google.

#### **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. 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. Collaborative with S. Treil, F. Nazarov.
- 2007-2012. DMS 0758552. Geometric measure theory, Bellman function, Harmonic analysis.
- 2013–2015, DMS 1301579, Universality problems in Harmonic Analysis. Collaborative with S. Treil, F. Nazarov.
- 2016–2018, DMS 1301579, Difficult problems of non-homogeneous Harmonic Analysis and GMT. Collaborative with S. Treil, F. Nazarov.

- 2015–2020, MSU foundation grant.

#### **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. Treil.
- Spanish Ministry of Education grant with Carlos Pérez, Univ. of Sevilla, Andalusia, Spain, Spring 2010.

#### **Collaborators**

Sergei Treil, Fedor Nazarov, Alexander Reznikov, Jonas Azzam, Mihalis Mourgoglou, Nikos Pattakos, Nick Boros, Wayne Smith, Carlos Pérez, Yuval Peres, Michael Sodin, Peter Yuditskii, Sandra Pott, Matt Bond, Izabella Laba, Vladimir Eiderman, Alexander Pushnitski, Allistaire Gillespie, Stefanie Petermichl, Oliver Dragicevic, Steve Hofmann, Xavier Tolsa, Gilles Pisier, Christoph Thiele.

#### **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  $L_p$  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 pseudo extendible 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. Khruschev). 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 Neumann 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 co-cycles 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 (inRussian).
- 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 théorème de Dulac-Ecalle-Illyashenko-Martinet-Moussu-Ramis étendu aux fonctions quasi-analytiques. Publ. Mathématique 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, New York, 1990.

### 1991-1994 publications

- 28.(with V. Peller, Dm. Yakubovich). A brief excursion to a theory of hypo-normal 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.Haussmann, 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 Mathématiciens 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.

### 1995-1999 publications

- 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. Kahane.
- (with R.Younis and D.Zheng) Sub-algebras 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 semi-hyperbolic dynamics. *Arkiv für Mat.*, **34** (1996), no. 1, 21-49.
45. (with Zoltan Balogh) Boundary Harnack principle on separated semi-hyperbolic 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 non-homogeneous 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 J. Esterle) Analytic left invariant subspaces and asymptotically holomorphic functions. *Comptes Rendus Acad. Sci. Paris, Série I*, **326**, 1998, p. 295-300.
60. (with S. Treil) Completely regular multivariate stationary processes and Muckenhoupt condition. *Pacific J. Math.*, **190**, (1999), no. 2, pp. 361-382.
61. (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.
62. (with F. Nazarov, S. Treil) Bellman function and two-weight inequality for martingale transform. *J. of Amer. Math. Soc.*, **12**, (1999), no. 4, 909–928.

## Publications 2000-2004

63. (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.
64. (with J. Esterle) Analytic left-invariant subspaces of weighted Hilbert spaces of sequences *J. Oper. Theory*, **45** (2001), no. 2, 265–301.
65. (with A. Gillespie, S. Pott, S. Treil) Logarithmic growth for matrix martingale transform. *J. London Math. Soc.* (2) **64** (2001), no. 3, 624–636.
66. (with A. Gillespie, S. Pott, S. Treil) A transference approach to estimates of vectorial Hankel operators. *St. Petersburg Math. J.*, **12**, (2001), no. 6.
67. (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.
68. (with St. Petermichl) Heating the Beurling operator: weakly quasiregular maps on the plane are quasiregular. *Duke Math. J.*, v. 112, No. 2, 2002, 281–305.
69. (with Esterle, Jean) Asymptotically holomorphic functions and translation invariant subspaces of weighted Hilbert spaces of sequences. *Ann. Sci. Ecole Norm. Sup.* (4) **35** (2002), no. 2, 185–230.
70. (with F. Nazarov and S. Treil) Accretive system  $Tb$  theorems for nonhomogeneous spaces. *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.) *Oper. 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 Finet, Catherine; Queffélec, Hervé) Image numérique et compacité d'opérateurs de composition sur un espace de Hilbert de séries de Dirichlet. (French) [Numerical range and compactness of some composition operators on a Hilbert space of Dirichlet series] *C. R. Math. Acad. Sci. Paris* **335** (2002), no. 4, 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) Local dimension-free estimates for volumes of sub-level sets of analytic functions. *Israel J. Math.*, **133** (2003), 269–283.
77. (with F. Nazarov, M. Sodin) The geometric Kannan-Lovász-Simonovits lemma, dimension-free estimates for volumes of sub-level sets of polynomials, and distribution of zeroes of random analytic functions. II. *St. Petersburg Math. J.*, **14** (2003), no. 2, 351–366.
78. (with F. Nazarov) Heat extension of the Beurling operator and estimates of its norms. *Algebra i Analiz*, **15** (2003) no. 4, 142–158, translation in *St. Petersburg Math. J.* **15** (2004) no. 4, 563–574.

80. (with O. Dragicevic) Sharp estimates of the Ahlfors-Beurling operator via averaging of Martingale transform. *Michigan Math. J.* **51** (2003), 415-435.
81. (with F. Nazarov and S. Treil)  $Tb$  theorems for nonhomogeneous spaces. *Acta Mathematica*, v. 190 (2003), pp. 151-239.
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