

# CURRICULUM VITAE

## 1 Personal data

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languages: English – fluent,  
Russian – native,  
German – some practice (Mittel Stufe I)

## 2 Education

2003 Habilitation (= Doctor of Science)  
1996 PhD in numerical mathematics, Russian Academy of Sciences (RAS)  
1991–1994 Moscow Institute of Physics & Technology (MIPT) Graduate School;  
1988–1991 undergraduate at MIPT, Dept. of Physics & Energetics Problems;  
1985–1988 undergraduate at MIPT, Dept. of General & Applied Physics;  
1982–1985 Leningrad University Boarding School 45

## 3 Employment history

### 3.1 Educational system

- since 2010 Full professor at Moscow Inst. for Physics & Technology (MIPT)  
and Moscow State University (Dept. Comp. Math. & Cybernetics,  
Dept. Math.& Mechanics since 2012)
- 2006 -2010 Associate professor at MIPT
- since 1995 Faculty member at MIPT

### 3.2 Research

- since 2019 Deputy director of Moscow Center for  
Fundamental and Applied Math (INM RAS branch)
- 2012,2013 Visiting researcher at TU Berlin, Germany
- 2012 Visiting Professor at U. Bordeaux-I, France
- since 2004 Leading research fellow at Institute for Numerical Mathematics,  
Russian Academy of Sciences (INM RAS)
- 2002-2004 Senior research fellow at INM RAS
- 2001-2002 PostDoc position at INM RAS
- 2000 Fellow of J. Kepler University, Linz, Austria
- 1996-2000 research fellow at INM RAS
- 1994-1996 research assistant at INM RAS
- 1992-1993 part time researcher at Moscow State University, Biological Dept.

## 4 PROJECT MANAGEMENT

- 1998-2001 RAS grant for young researchers "The development of a new method for investigation of integral equations"
- Russian Fund for Basic Research projects: 01-01-06299, 05-01-14012, 10-01-00407, 13-01-00115, 16-01-00568
- 2005-2006 Project MD-2488.2005.1 "Computations in moduli spaces of Riemann surfaces"
- 2007-2008 Project MD-4798.2007.1 "Riemann surfaces and moduli in applications"
- 2007-2008 Hitachi GST – INM RAS joint study project (coordinator)

- 2010-2019 "Optimal algorithms for solution of mathematical physics equations" – project of Math. Sci. Dept, Russ. Acad. Sci.
- 2016-2020 Russian Scientific Foundation – project 16-11-10349
- 2019-2020 Joint INM RAS - Huawei Technologies Project "Rational multiband approximation for electrical and electronic engineering" YBN2019065012

## 5 AWARDS, GRANTS, MEMBERSHIP, ETC...

- 1999 OeAD fellowship "Bewerber aus aller Welt"
- 2000 Premium of acad. V.E. Sokolov foundation in the field of mathematics
- since 2001 member of AMS
- 2001–2003 Fellowship of the President of Russian Federation
- 2001–2003 Grant from the Science Support Foundation (SSF)
- 2004–2005 SSF Prize "Best scientists", nomination "Doctors of sciences"
- 2008– 2013 Member of the editorial board of "Sbornik: Mathematics" journal
- 2009 S.V.Kovalevskaya Prize from the Russian Academy of Sciences.
- since 2011 Member of the Committee for awarding of the P.L.Chebyshev golden medal, Russ.Acad.Sci.
- 2016 Professor of RAS
- since 2016 Member of the RAS Expert Committee for awarding young scientists (mathematics),

## 6 SCOPE OF SCIENTIFIC INTEREST

### 6.1 Complex analysis and geometry (including Riemann surfaces and moduli)

Riemann Surfaces, uniformization, projective structures, Boundary value problems for analytic functions, Multidimensional complex geometry, vector bundles, monodromy, Teichmueller spaces, Kleinian groups, quasiconformal mappings Automorphic functions and forms, Riemann theta functions

### 6.2 Mathematical physics

Elliptic boundary value problems, operators of boundary influence (Poincare-Steklov), Pseudo Differential Operators, Solitons and integrable systems, symmetries, applications of Lie groups

and algebras, Singular integral equations, Exact analytical solutions, 2D micromagnetics.

### **6.3 Functional analysis and function theory**

Operator theory, Sobolev spaces; Distributions, weak solutions

### **6.4 Ordinary differential equations**

Fuchsian type ODE's and systems; Monodromy; analytical ODEs incl. Painleve equations; Lie group analysis for ODE

### **6.5 Numerical analysis**

Analytical methods in NA; exact Green function for model problems; Computation of special functions

### **6.6 Approximation theory and Optimization**

Chebyshev problems of least deviation; Convex analysis

## **7 EXPERTISE**

- Consulting for industrial companies: Hitachi Global Storage Technologies; Western Digital; Huawei Technologies.
- Peer reviews for the journals: J.Physics A; Izvestia RAS (Mathematics); Comp.Methods&Funct.Theory; Sbornik: Math; J.Approx.Th.; Trans.AMS; J.Comp.Math&Math.Physics; Math. Notes; LMS J. of Comput.&Math.; Funct. Analysis and Appl.; Comp.& Appl.Math, Complex variables and elliptic equations, Constr. Approx., J. of Geometry and Physics
- Expert of Russian Fund for Basic Research and Russian Scientific Fund, Expert of RAS, Dynasty foundation
- Reviewer for Mathematical Reviews (American Math.Society)

## **8 LIST OF PUBLICATIONS**

1. Bogatyrev A. On spectra of pairs of Poincare-Steklov operators //Russ. J. Num. Anal. & Math. Modelling. 8:3 (1993), 177–194.

2. Bogatyrev A. Spectral properties of Poincare-Steklov operators” - PhD thesis, INM RAS, Moscow, 1996. (Russian)
3. Bogatyrev A. To the problem with a pair of PS operators – MIPT Transactions, Eds. A.A.Bolibrukh, V.B.Lidski, 1996 pp. 53-65. (Russian)
4. Bogatyrev A. On discrete spectrum of the problem with two PS operators// Doklady Mathematics v 57:1, 40–42, 1998
5. Bogatyrev A. A geometric method for solving a series of integral PS equations// Math. Notes, 63:3 (1998), 302–310.
6. Bogatyrev A. On the geometry of Poincare-Steklov integral equations. – in ”Modern Group Analysis-VII”, Eds. N.H.Ibragimov, E.Straume, R.Naqvi, 1999 MARS publishers, Trondheim, 25–37.
7. Bogatyrev A. On relative arrangement of two biopolymer molecules minimizing the weighted sum of the interatomic distances squared. //Comput. Math. & Math. Physics, 38:7 (1998), pp. 1042–1045. (Also appeared in: C.A. Floudas, P.M.Pardalos (Eds.) Optimization in Computational Chemistry and Molecular Biology, Kluwer Acad.Publ.B.V., 2000)
8. Bogatyrev A. PS integral equations and Riemann monodromy problem// Functional Analysis and Applications, 34:2 (2000), 9–22.
9. Bogatyrev A. ”Support set” manifolds of Chebyshev polynomials on several intervals// Math.Notes. 67:6(2000), 699–706.
10. Bogatyrev A. Chebyshev polynomials and navigation in moduli space.// Russian J.Numerical Analysis and Math.Modelling, 14:3 (1999), 205–220.
11. Bogatyrev A. On evaluation of Chebyshev polynomials on several segments// Sbornik: Math., 190:11 (1999), 15–51.
12. Bogatyrev A.  $PS_3$  integral equations and projective structures on Riemann Surfaces// Sbornik: Math., 192:4 (2001), 3–36.
13. Bogatyrev A. Fibers of periods map are cells? //J.Comp.Appl.Math. 153:1-2 (2003), 547–548.
14. Bogatyrev A. Effective approach to the problems of least deviation //Sbornik: Math. 193:12(2002), 21 – 40
15. Bogatyrev A. Combinatorial description of moduli spaces of curves and extremal polynomials //Sbornik: Math. 194:10 (2003), 27–48.
16. Bogatyrev A. Extremal polynomials and algebraic curves // M.Neamtu, E.B.Saff (Eds.) ”Advances in constructive approximation”, Nashboro, TN, 2004, 109–122.

17. Bogatyrev A. Representations of the moduli spaces and effective computation of extremal polynomials //Sbornik: Math. 194:4 (2003), 3–28.
18. Bogatyrev A. Effective computation of optimal stability polynomials // *Calcolo* 41:4 (2004), 247–256.
19. Bogatyrev A.B. Effective solution of the problem about optimal stability polynomials //Sbornik: Math. 196:7 (2005), 27–50.
20. Bogatyrev A.B. Extremal polynomials and Riemann surfaces – MCCME publishers, Moscow, 2005, 178 pp.
21. A.B.Bogatyrev, Computations in moduli spaces //Comput. Methods Funct. Theory 7:2 (2007), 309–324.
22. A.B.Bogatyrev, Antisymmetric solutions of integral PS-3 equations// *Doklady RAS* 420:3 (2008) 378–382.
23. Bogatyrev A.B. Poincare-Steklov Integral Equations and Moduli of Pants – In "Analysis and Mathematical Physics", Trends in Mathematics, Birkhauser, 2009, 21–48.
24. A.B.Bogatyrev, Prime form and Schottky model //Computational Methods and Function Theory, 9:1 (2009), 47–55.
25. Bogatyrev A.B., Chebyshev representation for rational functions //Sbornik: Math., 201:11 (2010), 19-40.
26. Bogatyrev A.B., Pictorial Representations of antisymmetric Eigenfunctions of PS-3 integral Equations // *Math. Physics, Analysis and Geometry* (Springer), 13 (2010), 105-143.
27. A.Bogatyrev, M.Hassner, D.Yarmolich, An exact analytical-expression for the read sensor signal in magnetic data storage channels // in "Error-Correcting Codes, Finite Geometries and Cryptography", eds. A.A.Bruen, D.L.Wehlau, AMS series Contemporary Math. 523 (2010), 155-160.
28. A.Bogatyrev, V.I.Lebedev, Yu.M.Nechepurenko Optimal methods in numerical mathematics// *Russ. J. Num. Anal. Math. Modelling*, 25:5 (2010), 453-475.
29. Bogatyrev A.B., Elementary construction of Jenkins-Strebel differentials// *Math. Notes* 91:1 (2012), 143-146, arXiv:1012.4585v1 [math.CV]
30. Bogatyrev A.B., Rational functions admitting double decompositions //Transactions of Moscow Math Society, 73:2 (2012), 201-206; arXiv:1012.4577v1 [math.CV]
31. Bogatyrev A.B., Conformal mapping of rectangular heptagons// *Sbornik:Math*, 203:12 (2012), 35–56; arXiv:1109.0888.
32. A.B. Bogatyrev, Extremal Polynomials and Riemann Surfaces – Springer Monographs in

Mathematics (2012). ISBN 978-3-642-25633-2 (print)

33. A.B. Bogatyrev, Image of Abel-Jacobi map for hyperelliptic genus 3 and 4 curves //Journal Approx. Theory, 191 (2015), 38-45; arXiv:1312.0445
34. A.B. Bogatyrev, K.L. Metlov, Magnetic states in multiply-connected flat nano-elements//Low temperature physics, 41:10, (2015), 984–988; arXiv:1504.01162
35. Bogatyrev A. B., How many Zolotarev fractions are there? //Constructive Approx., 46:1 (2017), 37–45, arXiv:1511.05346
- 36 Bogatyrev A.B., and O.A.Grigoriev, Closed formula for the capacity of several aligned segments// Proceedings of Steklov Inst., vol. 298 (2017), 60–67, arXiv:1512.07154
37. Andrei B. Bogatyrev, Sergei A. Goreinov, Sergei Yu. Lyamaev, Analytical approach to the multiband filter synthesis and comparison to other approaches//Problems of Information Transmission, 53:3, (2017), 260–273, arXiv: 1612.01753.
- 38 Andrei Bogatyrev, Real meromorphic differentials: a language for the meron configurations in planar nanomagnets//Theoretical and Math Physics, 193:1, 2017, 1547–1559, arXiv: 1610.04984.
39. A. Bogatyrev and O.Grigoriev, Conformal mapping of rectangular heptagons II, Computational Methods and Function Theory, 18:2 (2018), 221-238, arXiv: math.CV/1612.01127
40. A. Bogatyrev, O. Grigor'ev, Water flow under rectangular dam, 2018 , arXiv: 1805.03542
41. A. Bogatyrev and K. Metlov, What makes magnetic skyrmions different from magnetic bubbles?, J. Magnetism and Magnetic Materials, 465:2 (2018), 743-746
- 42 Andrei B.Bogatyrev and Konstantin L.Metlov, Topological constraints on positions of magnetic solitons in multiply-connected planar magnetic nano-elements// Phys.Rev.B, 95:2, 024403 (2017)
43. Andrei B. Bogatyrev, Sergei A. Goreinov, Sergei Yu. Lyamaev, Efficient synthesis of optimal multiband filter//Russian Journal of Numerical Math and Math Modelling, 32:4, 2017, 217–223, arXiv: 1612.01753.
44. Andrei Bogatyrev, Combinatorial analysis of the periods mapping: topology of 2D fibers// Sbornik: Math, 210:11 (2019) arXiv:1606.03397
45. Bogatyrev A. B., Road sketches on Riemann surfaces. Part 1. – INM RAN, Moskva, 2019 old.inm.ras.ru/library/Bogatyrev/RSA.pdf
46. A. Bogatyrev, Recent Progress in Optimization of Multiband Electrical Filters (book chapter), Springer Optimization and Its Applications, 145, eds. I.C.Demetriou, P.M.Pardalos, Springer, 2019, 135–150, arXiv: 1806.05020
47. Bogatyrev A.B., Blaschke product for bordered surfaces, Analysis and Mathematical

Physics, 9 (2019), 1877–1886, arXiv: 1807.08731

48. Sergei Bezrodnykh, Andrei Bogatyrëv, Sergei Goreinov, Oleg Grigoriev, Harri Hakula, Matti Vuorinen, On capacity computation for symmetric polygonal condensers// Journal of Computational and Applied Mathematics, 361 (2019), 271–282, arXiv: 1804.01420

49. A. B. Bogatyrev, K. L. Metlov, Metastable states of sub-micron scale ferromagnetic periodic antidot arrays//Journal of Magnetism and Magnetic Materials, 489 (2019), 165416, 5 pp., arXiv: arXiv:1810.06011v1

50. A.B.Bogatyrev, Projective view at Optimization Problem for Multiband Filter, 2019 , 15 pp., arXiv: arXiv:1912.00197