

# College of William and Mary

## *Curriculum Vitae Standard Format*

### 1 Personal Information

1. Name: Vladimir Bolotnikov Date September 3, 2009
- Office Address: Jones Hall 129
- Phone: (757)221-2009
- Home Address: 116 Elizabeth Harrison lane, Williamsburg, VA, 23188
- Phone: (757)220-0176
2. Position: Associate Professor Mathematics
- Rank Department

### 2 Education

3. Academic degrees, institutions and dates

- |                            |   |      |
|----------------------------|---|------|
| Ph. D                      | Ben-Gurion University of the Negev,<br>Beer-Sheva, Israel | 1996 |
| B.Sc and M.Sc. with honors | Kharkov State University,<br>Kharkov, Ukraine             | 1984 |

### 3 Academic positions

4. Teaching and research positions, including dates

- |                  |   |
|------------------|---|
| 1998–<br>Present | Department of Mathematics, College of William and Mary, Williamsburg<br><b>Class 1963 Associate Professor</b> (2007 – Present)<br><b>Associate Professor</b> (2005 – 2007)<br><b>Assistant Professor</b> (2000 – 2005)<br><b>Visiting Assistant Professor</b> (1998 – 2000) |
| 1996–1998        | Department of Mathematics, the Weizmann Institute of Science,<br>Rehovot, Israel<br><b>Postdoctoral Fellow</b> (1996 – 1998)  |
| 1995–1996        | Department of Electrical Engineering, University de Marne la Vallee,<br>Paris, France   |

**Chateaubriand Postdoctoral Fellow** (1995 –1996)  
1991–1998 Department of Mathematics, Ben–Gurion University of the Negev  
Beer–Sheva, Israel  
**Lecturer** (1997 – 1998)  
**Instructor** (1991 – 1995)

## 4 Honors, Prizes and Awards

2007 Thomas Jefferson Teaching Award  
2005 Alumni Fellowship Award for Excellence in Teaching  
2004 Simon Teaching Prize  
1999 PIMS Postdoctoral Fellowship (not used)  
1995 Chateaubriand Fellowship (France)  
1994 Miphal Hapais Award (Israel)  
1984 Ukrainian Ministry of Higher Education Award

## 5 Courses taught

Calculus, multi-variable calculus, discrete mathematics, introductory set theory, probability, abstract algebra, linear algebra, foundations of higher mathematics, complex analysis, elementary real analysis, intermediate real analysis, topics in geometry.

## 6 Fellowships and Grants

1. 2001, 2002, 2003: Summer Research grants from the College of William and Mary
2. 2009–2012: NSF Grant DMS-0901124

## 7 Research

### 7.1 Refereed research papers

1. *Description of solutions of a degenerate moment problem on the axis and the half-axis.* Teor. Funktsii Funktsional. Anal. i Prilozhen., **50** (1988), 25–31.

2. *Two sided interpolation problems for a class of analytic functions.* Z. Anal. Anwendungen, **12** (1993), No. 2, 211–238 (with D. Alpay).
3. *On some operator colligations and associated reproducing kernel Hilbert spaces.* Oper. Theory Adv. Appl., **61** (1993), 1–27 (with D. Alpay, A. Dijksma and H. de Snoo).
4. *Two-sided Nevanlinna–Pick problem in the Stieltjes class.* Oper. Theory Adv. Appl., **62** (1993), 15–37.
5. *On a class of functions analytic in a half disk and an associated interpolation problem.* J. Math. Anal. Appl., **182** (1994), No.1, 1–22 (with D. Alpay).
6. *On a general moment problem and certain matrix equations.* Linear Algebra Appl., **203/204** (1994), 3–43 (with D. Alpay).
7. *Tangential Carathéodory-Fejer interpolation for Stieltjes functions at real points.* Z. Anal. Anwendungen, **13** (1994), No. 1, 111–136.
8. *The Carathéodory–Féjer interpolation problem in Hardy spaces.* Z. Anal. Anwendungen, **13** (1994), No.4, 583–597 (with D. Alpay).
9. *On tangential interpolation of  $H_2$  functions.* Trans. Amer. Math. Soc., **347** (1995), 675–686 (with D. Alpay and Y. Peretz).
10. *Degenerate Stieltjes matrix moment problem and associated  $J$ -inner polynomials.* Z. Anal. Anwendungen, **14** (1995), No. 3, 441–468.
11. *Two-sided interpolation for matrix functions with entries in the Hardy space.* Linear Algebra Appl., **223/224** (1995), 31–56 (with D. Alpay).
12. *Classes of pairs of meromorphic matrix functions generated by positive kernels and associated Nevanlinna–Pick problem.* Integral Equations Operator Theory, **23** (1995), No. 3, 245–267 (with D. Alpay).
13. *An interpolation problem with symmetry and related questions.* Z. Anal. Anwendungen, **15** (1996), No. 1, 19–29 (with D. Alpay and P. Loubaton).
14. *On degenerate Hamburger moment problem and extensions of non-negative Hankel matrices.* Integral Equations Operator Theory, **25** (1996), No. 3, 253–276.

15. *On some operator colligations and associated reproducing kernel Pontryagin spaces.* J. Funct. Anal., **136**, (1996), No. 1, 39–80 (with D. Alpay, A. Dijksma and H. de Snoo).
16. *On tangential  $H_2$  interpolation with second order norm constraints.* Integral Equations Operator theory, **24** (1996), No. 2, 156–178 (with D. Alpay and P. Loubaton).
17. *On two-sided residue interpolation for matrix-valued  $H_2$ -functions with symmetries.* J. Math. Anal. Appl., **200** (1996), No. 1, 76–105 (with D. Alpay and P. Loubaton).
18. *On some general moment problem on the half-axis.* Linear Algebra Appl., **255** (1997), 57–112.
19. *Dissipative periodic systems and symmetric interpolation in the Schur class.* Archiv Math. (Basel), **68** (1997), No. 5, 371–387 (with D. Alpay and P. Loubaton).
20. *On tangential interpolation in Hilbert space modules and some applications.* Oper. Theory Adv. Appl., **95** (1997), 37–68 (with D. Alpay).
21. *On interpolation for Hardy functions in a certain class of domains under moment type constraints.* Houston J. Math., **23**, No. 3 (1997), 539–571 (with D. Alpay and P. Loubaton).
22. *On a new positive completion problem for Toeplitz block matrices.* Linear Algebra Appl., **268** (1998), 247–287 (with D. Alpay and P. Loubaton).
23. *On the Nevanlinna–Pick problem for generalized Stieltjes functions.* Integral Equations Operator Theory, **30**, (1998), No. 4, 379–408 (with D. Alpay and A. Dijksma).
24. *On Two-Sided Interpolation for Upper Triangular Hilbert–Schmidt Operators.* Integral Equations Operator Theory, **31**, (1998), No. 3, 259–286 (with D. Alpay).
25. *On tangential interpolation with symmetries and multipoint interpolation problem for matrix-valued Hardy functions.* Integral Equations Operator Theory, **32**, (1998), No. 1, 1–28 (with D. Alpay and L. Rodman).
26. *Hilbert spaces contractively included in the Hardy space of the bidisk.* C. R. Acad. Sci. Paris Ser. I Math. **326** (1998), No. 12, 1365–1370 (with D. Alpay, A. Dijksma, J. Rovnyak and C. Sadosky).

27. *On degenerate interpolation, maximum entropy and extremal problems for matrix Schur functions.* Integral Equations Operator Theory, **32**, (1998), No. 4, 367–435 (with H. Dym).
28. *On Bitangential Interpolation in the Time Varying Setting for Hilbert Schmidt Operators: the continuous time case.* J. Math. Anal. Appl., **228** (1998), No. 2, 275–292 (with D. Alpay, B. Freydin and Y. Peretz).
29. *On tangential interpolation problem for matrix-valued  $\mathbf{H}_2$ -functions of two variables.* Proc. Amer. Math. Soc., **127** (1999), No. 6, 1789–1799 (with D. Alpay).
30. *Carathéodory–Féjer problem for pairs of meromorphic functions.* Math. Nachr. 199 (1999), 17–69 (with D. Alpay).
31. *One-sided tangential interpolation for operator-valued Hardy functions on polydisks.* Integral Equations Operator Theory, **35** (1999), No. 3, 253–270 (with D. Alpay and L. Rodman).
32. *Normal forms and joint numerical range of doubly commuting matrices.* Linear Algebra Appl., **301** (1999), 187–194 (with L. Rodman).
33. *On an operator approach to interpolation problems for Stieltjes functions.* Integral Equations Operator Theory, **35** (1999), No. 4, 423–470 (with L. A. Sakhnovich).
34. *On two-sided interpolation for upper triangular matrices.* Electron. J. Linear Algebra, **6** (1999/2000), 31–55 (with D. Alpay).
35. *Sections de Brune en théorie des systèmes non stationnaires.* C. R. Acad. Sci. Paris Ser. I Math., **330** (2000), 173–178 (with D. Alpay, P. Dewilde and A. Dijksma).
36. *On the bitangential interpolation problem for contractive valued functions in the polydisk.* J. Oper. Theory **44** (2000), 277–301 (with D. Alpay, and J. A. Ball).
37. *Hilbert spaces contractively included in the Hardy space of the bidisk.* Positivity, **5** (2001), 25–50 (with D. Alpay, A. Dijksma and C. Sadosky).
38. *A coisometric realization for triangular integral operators.* Oper. Theory Adv. Appl., **122** (2001), 13–52 (with D. Alpay, A. Dijksma and Y. Peretz).

39. *Minimal distortion problems for classes of unitary matrices.* Electron. J. Linear Algebra **8** (2001), 26–46 (with C.-K. Li and L. Rodman).
40. *On the second order interpolation for rational vector functions.* Oper. Theory Adv. Appl. **123** (2001), 139–159.
41. *On positivity of analytic matrix functions in polydisks.* Linear Algebra Appl., **328** (2001), 69–94 (with L. Rodman).
42. *Positive extension and completion problems for a class of structured matrices.* Linear and Multilinear Algebra, **48** (2001), 189–235 (with L. Rodman).
43. *Two-sided tangential interpolation for Hilbert–Schmidt operator functions on polydisks.* Oper. Theory Adv. Appl. **124** (2001), 63–87 (with D. Alpay and L. Rodman).
44. *The Schur algorithm and reproducing kernel Hilbert spaces in the ball,* Linear Algebra Appl. **342** (2002), 163–186 (with D. Alpay and H. T. Kaptanoğlu).
45. *Brune sections in the nonstationary case,* Linear Algebra Appl. **343–344** (2001), 389–418 (with D. Alpay, P. Dewilde, and A. Dijksma).
46. *A boundary Nevanlinna–Pick problem for a class of analytic matrix-valued functions in the unit ball,* Linear Algebra Appl., **346** (2002), 239–260.
47. *Some extensions of Loewner’s theorem on monotone matrix functions,* J. Funct. Anal., **189** (2002), 1–20 (with D. Alpay, A. Dijksma and J. Rovnyak).
48. *Finite dimensional backward shift invariant subspaces of Arveson spaces,* Linear Algebra Appl., **349** (2002), 265–282 (with L. Rodman).
49. *Shells of matrices in indefinite inner product* Electron. J. Linear Alg. **9** (2002), 67–92 (with C.-K. Li, P. Meade, C. Mehl and L. Rodman).
50. *Two-sided Residue Interpolation in Matrix  $H_2$  Spaces with Symmetries: Conformal Conjugate Involutions,* Linear Algebra Appl., **351/352** (2002), 27–68 (with D. Alpay and L. Rodman).

51. *Nonstationary analogues of the Herglotz representation theorem: the discrete unbounded case*, Archiv Math. **78** (2002), 465–474 (with D. Alpay, A. Dijksma, and B. Freydin).
52. *On a bitangential interpolation problem for contractive valued functions on the unit ball*, Linear Algebra Appl. **353** (2002), 107–147 (with J. A. Ball).
53. *An interpolation problem on the distinguished boundary of the polydisk for Schur–Agler functions*, J. Math. Anal. Appl. **273** (2002), no. 2, 328–348. (with J. A. Ball).
54. *Interpolation for multipliers on reproducing kernel Hilbert spaces*, Proc. of the AMS **131** (2003), 1373–1383.
55. *Pairs of functions with indefinite Pick matrices*, Linear Algebra Appl., **367** (2003), 271–290 (with A. Kheifets and L. Rodman).
56. *Functions with Pick matrices having bounded number of negative eigenvalues*, Contemporary Mathematics, **323** (2003), 393–417 (with A. Kheifets and L. Rodman).
57. *A bitangential interpolation problem on the closed unit ball for multipliers of the Arveson space*, Integral Equations Operator Theory **46** (2003), 125–164 (with J. A. Ball).
58. *Krein–Langer factorization via pole triples*, Integral Equations Operator Theory **47** (2003), no. 2, 169–195 (with L. Rodman).
59. *Nevanlinna–Pick interpolation: Pick matrices have bounded number of negative eigenvalues*, Proc. of the AMS **132** (2004), 769–780 (with A. Kheifets and L. Rodman).
60. *Positive extension problems for a class of structured matrices*, Linear Algebra Appl. **281** (2004), 165–195 (with P. Smith).
61. *Remarks on interpolation in reproducing kernel Hilbert spaces*, Houston J. Math. **30** (2004), no. 2, 559–576 (with L. Rodman).
62. *Jet functions having indefinite Carathéodory–Pick matrices*, Linear Algebra Appl., **385** (2004), 215–286 (with A. Kheifets and L. Rodman).
63. *Finite dimensional backward shift invariant subspaces of some classes of reproducing kernel Hilbert spaces*, Linear Multilinear Algebra, **52** (2004), 221–334 (with L. Rodman).

64. *Boundary interpolation for contractive-valued functions on circular domains in  $\mathbf{C}^n$* , in: *Current trends in operator theory and its applications*, 107–132, Oper. Theory Adv. Appl., **OT 149**, Birkhäuser, Basel, 2004 (with J. A. Ball).
65. *Realization and interpolation for Schur-Agler-class functions on domains with matrix polynomial defining function in  $\mathbf{C}^n$* , J. Funct. Anal. **213** (2004), 45–87 (with J. A. Ball)
66. *On Caratheodory–Fejer problem for generalized Schur functions*, Integral Equations Operator Theory, **50** (2004), no.1, 9-41.
67. *Operator valued jet functions with positive Carathéodory–Pick operators*, Integral Equations Operator Theory, **50** (2004), no. 3, 291–304 (with A. Kheifets and L. Rodman).
68. *Interpolation problems with operator argument for contractive-valued functions on general domains in  $\mathbf{C}^n$* , New York J. **11** (2005), 247–290 (with J. A. Ball).
69. *Boundary Nevanlinna–Pick interpolation problems for generalized Schur functions*, Operator Theory: Advances and Applications **OT 165** (2006), 67–119 (with A. Kheifets).
70. *On boundary interpolation for matrix Schur functions*, Mem. Amer. Math. Soc. **181** (2006), no. 856 (with H. Dym).
71. *A higher order analogue of the Carathéodory–Julia theorem*, J. Funct. Anal. **237** (2006), no. 1, 350–371 (with A. Kheifets).
72. *On negative inertia of Pick matrices associated with generalized functions*, Integral Equations Operator Theory **56** (2006), no. 3, 323–355 (with A. Kheifets).
73. *Multivariable backward-shift-invariant subspaces and observability operators*, Multidimens. Syst. Signal Process. **18** (2007), no. 4, 191–248 (with J. A. Ball and Q. Fang).
74. *Schur-class multipliers on the Fock space: de Branges-Rovnyak reproducing kernel spaces and transfer-function realizations*, in: *Operator Theory, structured matrices and dilations*, pp. 85–114, Theta, Bucharest, 2007 (with J. A. Ball and Q. Fang).
75. *Transfer-function realization for multipliers of the Arveson space*, J. Math. Anal. Appl. **333** (2007), no. 1, 68–92 (with J. A. Ball and Q. Fang).

76. *Interpolation in the noncommutative Schur-Agler class*, J. of Operator Theory **58** (2007), no. 1, 83–126 (with J. A. Ball).
77. *The higher order Carathéodory–Julia theorem and related boundary interpolation problems*, Operator Theory: Advances and Applications **OT 179** (2008), 63–102 (with A. Kheifets).
78. *A uniqueness result on boundary interpolation*, Proc. Amer. Math. Soc. **136** (2008), 1705–1715.
79. *Schur-class multipliers on the Arveson space: de Branges-Rovnyak reproducing kernel spaces and commutative transfer-function realizations*, J. Math. Anal. Appl. **341** (2008), 519–539 (with J. A. Ball and Q. Fang).
80. *A boundary analogue of the Carathéodory-Schur interpolation problem*, Proc. Amer. Math. Soc. **136** (2008), no. 9, 3121–3131.
81. *Interpolation problems for Schur multipliers on the Drury-Arveson space: from Nevanlinna-Pick to Abstract Interpolation Problem*, Integral Equations Operator Theory **62** (2008), no. 3, 301–349 (with J. A. Ball).
82. *Carathéodory–Julia type theorems for operator valued Schur functions*, J. d’Analyse Mathématique **106** (2008), 237–270 (with A. Kheifets).
83. *On boundary angular derivatives of an analytic self-map of the unit disk*, C. R. Acad. Sci. Paris, Ser. I **347** (2009), 227–230.
84. *Boundary rigidity for a class of meromorphic functions on the unit disk*, Operators and Matrices **3** (2009), no. 2, 283–301.
85. *Nevanlinna–Pick meromorphic interpolation: the degenerate case and minimal norm solutions*, J. Math. Anal. Appl. **353** (2009), pp. 642–651.
86. *On an interpolation problem for generalized Schur functions*, Oper. Theory Adv. Appl. **OT 195** (2009), 83–101.
87. *Carathéodory-Julia type conditions and symmetries of boundary asymptotics for analytic functions on the unit disk*, to appear in Math. Nachr. (with A. Kheifets).
88. *On inertia of certain structured Hermitian matrices*, to appear in Operator Theory: Advances and Applications.

89. *An algorithm for finding low degree rational solutions of the Schur coefficient problem*, to appear in *Fuctiones et Approximatio*.
90. *A constrained Nevanlinna-Pick interpolation problem for matrix-valued functions*, to appear in *Indiana Math. J.* (with J.A. Ball and S. ter Horst).

## 7.2 Other Publications

91. *Device for trial of the conveying tags*. Certificate of authority # 738981 (USSR), *Bulletin of Inventions*, vol. 21 (1980) (with A. Bolotnikov).
92. *Device for trial of shroud elements*. Certificate of authority # 1025641 (USSR), *Bulletin of Inventions*, vol. 24 (1983) (with A. Bolotnikov).
93. *Integral representations of the positive definite kernels of the form  $k(t, \tau) = s(t + \tau) + f(t - \tau)$* . Ukr.NIINTI, manuscript # 1307 (1984).
94. *Integral representations of a class of discrete positive definite kernels*. Ukr.NIINTI, manuscript # 2093 (1985).
95. *Parametrization of the  $J$ -elementary multiple factor of incomplete rank with the pole at the boundary of a domain*. Ukr.NIINTI, manuscript # 2097 (1985).
96. *Schur algorithm for degenerate matrix moment problems*. Ukr.NIINTI, manuscript # 1097 (1987)
97. *On bitangential interpolation problem in the Stieltjes class*. VINITI, manuscript # 3848 (1989).
98. *Bitangential Carathéodory–Féjer problem in the Stieltjes class*. VINITI, manuscript # 2478 (1990).

## 7.3 Conferences talks

- 1993      The annual meeting of Israel Math. Society, Beer–Sheva, VIII Haifa matrix conference, Haifa,
- 1994      IV International Linear Algebra Society conference, Rotterdam, V Conference on Schur analysis, Leipzig,
- 1995      II Congress on Industrial and Applied Mathematics, Hamburg

- IX Haifa matrix conference, Haifa,  
IWOTA-95, Regensburg,  
VI Conference on Schur analysis, Leipzig,
- 1997 Conference on operator theory in honour of M. Livshits, Beer-Sheva,  
VII conference on Schur analysis, Leipzig,
- 1998 The annual meeting of Israel Math. Society, Jerusalem,  
IWOTA-98, Groningen,  
Virginia operator theory and complex analysis meeting, Richmond,
- 2001 SouthEastern Analysis Meeting SEAM-17, Athens, GA,  
SIAM Conference on Signals, Systems and Control, Boston,  
Trends in Banach Spaces and Operator Theory, Memphis,
- 2002 South Eastern Analysis Meeting, Chapel Hill,  
Sectional meeting of the AMS, Atlanta,  
The X-th International Linear Algebra Society conference, Auburn,  
Great Plains Operator Theory Symposium, Charlotte  
IWOTA-2002, Blacksburg,  
MTNS (mathematical theory of networks and systems), South Bend, IN,
- 2003 South Eastern Analysis Meeting, Knoxville  
SIAM meeting on Applied Linear Algebra, Williamsburg  
International Conference on Matrix Analysis, Fort Lauderdale,
- 2005 South Eastern Analysis Meeting, Lexington, VA  
IWOTA-2005, Storrs,  
Virginia operator theory and complex analysis meeting, Charlottesville
- 2006 International Conference on Matrix Analysis, Fort Lauderdale
- 2007 South Eastern Analysis Meeting, Richmond  
Classical Analysis conference, Chapel Hill)
- 2008 IWOTA-2008, Williamsburg  
MTNS (mathematical theory of networks and systems), Blacksburg
- 2009 Workshop on Multivariable Operator Theory (Fields Institute, Toronto).

## 8 Professional service

1. Reviewer for Mathematical Reviews and for Zentralblatt MATH.

2. Referee for “Journal of Functional Analysis”, “Proceedings of the American Mathematical Society”, “Integral Equations and Operator Theory”, “Contemporary mathematics”, “Operator Theory: Advances and Applications”, “Linear Algebra and Applications”, “Journal of Mathematical Analysis and Applications”, “Linear and Multilinear Algebra”, “Applied Mathematics Letters”, “International Journal of Mathematics”, “Journal of Computational and Applied Mathematics”, “Indian Journal of Pure and Applied Mathematics”, “Mathematische Nachrichten”, “Fuctiones et Approximatio” “Complex Variables and Elliptic Equations”, “Complex Analysis and Operator Theory”, “Operators and Matrices”.
3. Refereed proposals for the Austrian National Science Foundation, Israeli National Science Foundation, Israel-USA Binational Science Foundation.
4. Organizer of special Sessions at the IV-th SIAM Conference on Linear Algebra in Signals, Systems and Control (Boston, MA, August 2001), IWOTA (Blacksburg, VA, August 2002), MTNS (Blacksburg, VA, August 2008.)
5. Co-organizer of the International workshop on operator theory and applications (IWOTA, Williamsburg, 2008).

## 9 Service within the College

1. Merit Evaluation Committee (Fall 2003–Spring 2005, Fall 2007–Spring 2008)
2. Personnel Committee (Fall 2006–Spring 2007, Fall 2008–Spring 2010)
3. Hiring Committees (2006, 2007, 2008)
4. Students’ advising (since 2005): freshmen/sophomore advising (11 students) and primary major advising (7 students).
5. Served on 6 Honors Theses committees (for Departments of Mathematics, Physics, Chemistry and Computer Science).
6. AD hoc committee to update handbook at the Department of Mathematics (Fall, 2000)
7. Space committee at the Department of Mathematics (Fall, 2000–present)

8. Admissions Liaison Committee and Goldwater Advisor (Spring 2002)
9. Library (SWEM) representative at the Mathematics Department (Fall 2002–Spring 2005)