

# PUBLICATIONS

## Books/Chapters:

1. *Information, Uncertainty, Complexity*, with J.F. Traub and H. Woźniakowski, Addison-Wesley, Reading, Ma., 1983. *Russian* translation by MIR, Moscow, 1988.
2. *Information-Based Complexity*, with J.F. Traub and H. Woźniakowski Academic Press, New York, NY, 1988.
3. *Information-Based Complexity Workshop*, Proceedings of a workshop held in Minneapolis, MN, August 5–14, 2002. Edited by E. Novak, G. W. Wasilkowski and H. Woźniakowski. *J. of Complexity* **19** (2003), no. 6.
4. *Festschrift for the 60th Birthday of Henryk Woźniakowski*. Edited by Z. Kacewicz, L. Plaskota, and G.W. Wasilkowski. *J. of Complexity* 2007.
5. “Spline algorithms for linear problems,” Chapter 4 in *A General Theory of Optimal Algorithms*, by J.F. Traub and H. Woźniakowski, Academic Press, 1980.

## Papers:

6. “Can any stationary iteration using linear information be globally convergent?” *J. of ACM* **27** (1980) 263-269.
7. “n-evaluation conjecture for multipoint iterations for the solution of scalar nonlinear equations,” *J. of ACM* **28** (1981), 71-80.
8. “The strength of nonstationary iteration,” *Aequationes Mathematicae* **24** (1982), 243-260.
9. “Any iteration for polynomial equations using linear information has infinite complexity,” *Theoretical Computer Science* **22** (1983), 195-208.
10. “Inverse function problem,” *J. of Inf. Processing and Cybernetics*, **19** (1983), 491-496.
11. “Some nonlinear problems are as easy as the approximation problem,” *Computers and Mathematics with Applications* **10** (1984), 351-363.
12. “Average case optimality for linear problems,” with J.F. Traub and H. Woźniakowski, with J.F. Traub and H. Woźniakowski, *Theoretical Computer Science* **29** (1984), 1-25.
13. “Can adaption help on the average?” with H. Woźniakowski, *Numerische Mathematik* **44** (1984), 169-190.
14. “Average case optimality,” *J. of Complexity* **1** (1985), 107-117.

15. "Optimal algorithms for linear problems with Gaussian measures," *Rocky Mt. J. of Math.* **16** (1986), 727-749.
16. "Approximation of linear functionals on Banach spaces with a Gaussian measure," with D. Lee, *J. of Complexity* **2** (1986), 12-43.
17. "Average case optimal algorithms in Hilbert spaces," with H. Woźniakowski, *J. of Approximation Theory* **47** (1986), 17-25.
18. "Information of varying cardinality," *J. of Complexity* **2** (1986), 204-228.
19. "Average condition number for solving linear equations," with M. Shub, N. Weiss and H. Woźniakowski, *Linear Algebra and its Applications* **83** (1986), 79-102.
20. "How powerful is continuous nonlinear information for linear problems?" with B. Kacwicz, *J. of Complexity* **2** (1986), 306-316.
21. "A note on the trade-off between sampling and quantization in signal processing," with D. Lee and T. Pavlidis, *J. of Complexity* **3** (1987), 359-371.
22. "On optimal algorithms in an asymptotic model with Gaussian measure," with H. Woźniakowski, *SIAM J. Math. Anal.* **19** (1988), 632-647.
23. "On adaption with noisy information," with J.B. Kadane and H. Woźniakowski, *J. of Complexity* **4** (1988), 257-276.
24. "Maximum likelihood estimators and worst case optimal algorithms for system identification," with R. Tempo, *Systems & Control Letters* **10** (1988), 265-270.
25. "A clock synchronization problem with random delays," *J. of Complexity*, **5** (1989), 1-11.
26. "Randomization for continuous problems," *J. of Complexity* **5** (1989), 195-218.
27. "On adaptive information with varying cardinality for linear problems with elliptically contoured measures," *J. of Complexity* **5** (1989), 363-368.
28. "Mixed settings for linear problems," with H. Woźniakowski, *J. of Complexity* **5** (1989), 457-465.
29. "On average complexity of multivariate problems," with A. Papageorgiou, *J. of Complexity* **6** (1990), 1-23.
30. "On piecewise-polynomial approximation for functions with a fractional derivative bounded in  $L_p$ -norm," *J. of Approximation Theory* **62** (1990), 372-380.
31. "Note on quantization for signals with bounded  $(r + 1)$ st derivative," *J. of Complexity* **6** (1990), 278-289.

32. “On the power of adaptive information for functions with singularities,” with F. Gao, *Mathematics of Computation* **58** (1992), 285-304.
33. “On average complexity of global optimization problems,” *Mathematical Programming* **57** (1992), 313-324.
34. “On a posteriori upper bounds for approximating linear functionals in probabilistic setting,” *J. Complexity* **8** (1992), 424-433.
35. “Discontinuity detection and thresholding – a stochastic approach,” with D. Lee, *J. Complexity* **9** (1993), 76-96.
36. “A new zero-crossing-based edge detector,” with D. Lee and R. Mehrotra, *IEEE Trans. on Image Processing* **2**, (1993), 265-268.
37. “On detecting regularity of functions: A probabilistic analysis,” with F. Gao, *J. of Complexity* **9** (1993), 373-386.
38. “Integration and approximation of multivariate functions: Average case complexity with isotropic Wiener measure,” *Bulletin of the American Mathematical Society* **28** (1993), 308-314.
39. “On multivariate integration of stochastic processes,” with K. Ritter and H. Woźniakowski, *International Series of Numerical Mathematics* **112** (1993), 331-347.
40. “There exists a linear problem with infinite combinatorial complexity,” with H. Woźniakowski, *J. Complexity* **9** (1993), 326-337.
41. “Numerical stability of a convex hull algorithm for simple polygons,” with J. W. Jaromczyk, *Algorithmica* **10** (1993), 457-472.
42. “Integration and approximation of multivariate functions: Average case complexity with isotropic Wiener measure,” (full version) *J. of Approximation Theory* **77** (1994), 212-227.
43. “Computing convex hull in floating point arithmetic,” with J. W. Jaromczyk, *Computational Geometry: Theory and Applications* **4** (1994), 283-292.
44. “Parallel B-spline surface interpolation on a mesh-connected processor array,” with F. Cheng, J. Wang, C. Zhang, and W. Wang, *J. Parallel and Distributed Computing* **24** (1995), 224-229.
45. “Multivariate integration and approximation for random fields satisfying Sacks-Ylvisaker Conditions,” with K. Ritter and H. Woźniakowski, *Annals of Applied Probability* **5** (1995), 518-540.

46. “Explicit cost bounds of algorithms for multivariate tensor product problems,” with H. Woźniakowski, *J. of Complexity* **11** (1995), 1-56.
47. “Probabilistic and average linear widths in  $L_\infty$ -norm with respect to  $r$ -fold Wiener measure,” with V. Maiorov, *J. of Approximation Theory* **84** (1995), 31-40.
48. “On tractability of path integration,” with H. Woźniakowski, *J. of Mathematical Physics* **37** (4) (1996), 2071-2088.
49. “On the average case complexity of solving Poisson equations,” with K. Ritter, in *Lectures in Applied Mathematics*, **Vol. 32**, (J. Renegar, M. Shub, and S. Smale, eds.), 1996, pp. 677-687.
50. “Average case complexity of multivariate integration and function approximation; An overview,” *J. of Complexity* **12** (1996), 257-272.
51. “Integration and  $L_2$ -approximation; Average case setting with isotropic Wiener measure for smooth functions,” with K. Ritter, *Rocky Mt. J. of Math.* **26** (1997), 1541-1557.
52. “The exponent of discrepancy is at most 1.4778...,” with H. Woźniakowski, *Mathematics of Computation* **66** (1997), 1125-1132.
53. “Cubature and reconstruction of smooth isotropic random function,” with K. Ritter, in *Applied Stochastics and Optimization* (O. Mahrenholtz, K. Marti, and R. Mennicken, eds.), AkademieVerlag, 1997, pp. 120-124.
54. “Weighted tensor-product algorithms for linear multivariate problems,” with H. Woźniakowski, *J. of Complexity* **15**, (1999), 402-447.
55. “Complexity of weighted approximation over  $\mathbf{R}^1$ ,” with H. Woźniakowski, *J. of Approximation Theory* **103** (2000), 223-251.
56. “A new optimal algorithm for weighted approximation and integration over  $\mathbf{R}$ ,” with Lei Han, *Numerical Algorithms* **23** (2000), 393-406.
57. “On the complexity of stochastic integration,” with H. Woźniakowski, *Mathematics of Computation* **70** (2000), 685-698.
58. “A new algorithm and worst case complexity for Feynman-Kac path integration,” with L. Plaskota and H. Woźniakowski, *J. of Computational Physics* **164** (2000), 335-353.
59. “The inverse of the star-discrepancy depends linearly on the dimension,” with S. Heinrich, E. Novak, and H. Woźniakowski, *Acta Arithmetica* **XCVI.3** (2001), 279-302.
60. “Complexity of weighted approximation over  $\mathbf{R}^d$ ,” with H. Woźniakowski, *J. of Complexity* **17** (2001), 722-740.

61. “The exact exponent of sparse grid quadratures in the weighted case,” with L. Plaskota, *J. of Complexity* **17** (2001), 840-849.
62. “On the power of standard information for weighted approximation,” with H. Woźniakowski, *Foundations of Computational Mathematics* **1** (2001), 417-434.
63. “Worst case complexity of weighted approximation and integration over  $\mathbf{R}^d$ ,” with Youming Li, *J. of Complexity* **18** (2002), 330-345.
64. “Average case complexity of weighted approximation and integration over  $\mathbf{R}_+$ ,” with L. Plaskota and K. Ritter, *J. of Complexity* **18** (2002), 517-544.
65. “A Monte Carlo algorithm for weighted integration over  $\mathbf{R}^d$ ,” with P. Gajda, Y. Li, and L. Plaskota, *Mathematics of Computation* **73** (2004), 813-825.
66. “Optimal designs for weighted approximation and integration of stochastic processes over  $[0, \infty)$ ,” with L. Plaskota and K. Ritter, *J. Complexity* **20** (2004), 108-131.
67. “On polynomial-time property for a class of randomized quadratures,” *J. of Complexity* **20** (2004), 624-637.
68. “On tractability of weighted integration over bounded and unbounded regions in  $\mathbf{R}^s$ ,” with F. J. Hickernell and I. H. Sloan, *Mathematics of Computation* **73** (2004), 1885-1901.
69. “On strong tractability of weighted multivariate integration,” with F. J. Hickernell and I. H. Sloan, *Mathematics of Computation* **73** (2004), 1903-1911.
70. “Smolyak’s algorithm for integration and  $L_1$ -approximation of multivariate functions with bounded mixed derivatives of second order,” with L. Plaskota, *Numerical Algorithms*, **36** (2004), 229-246.
71. “Finite-order weights imply tractability of linear multivariate problems,” with H. Woźniakowski, *J. of Approximation Theory* **130** (2004), 57-77.
72. “A piecewise constant algorithm for weighted  $L_1$  approximation over bounded or unbounded regions in  $\mathbf{R}^s$ ,” with F. J. Hickernell and I. H. Sloan, *SIAM J. Numerical Analysis* **43** (2005), 1003-1020.
73. “Polynomial-time algorithms for multivariate problems with finite-order weights; worst case setting” with H. Woźniakowski, *Foundations of Computational Mathematics* **5** (2005), 451-491.
74. “Adaption allows efficient integration of functions with unknown singularities,” with L. Plaskota, *Numerische Mathematik* **102** (2005), 123-144.

75. “Randomly-shifted lattice rules for unbounded integrands,” with F. Y. Kuo and B. J. Waterhouse, *J. Complexity* **22** (2006), 630-651.
76. “The power of standard information for multivariate approximation in the randomized setting,” with H. Woźniakowski, *Mathematics of Computation* **76** (2007), 965-988.
77. “Multivariate  $L_\infty$  approximation in the worst case setting over reproducing kernel Hilbert spaces,” with F. Y. Kuo and H. Woźniakowski, *J. Approximation Theory* **152** (2008), 135–160.
78. “The power of adaption for approximating functions with singularities,” with L. Plaskota and Y. Zhao, *Mathematics of Computation* **77** (2008), 2309-2338.
79. “Polynomial-time algorithms for multivariate problems with finite-order weights; average case setting,” with H. Woźniakowski, *Foundations of Computational Mathematics* **9** (2009), 105-132.
80. “Uniform approximation of piecewise  $r$ -smooth and globally continuous functions,” with L. Plaskota, *SIAM J. Numerical Analysis* **47** (2009), 762-785.
81. “A survey of average case complexity for linear multivariate problems,” with H. Woźniakowski, an invited review paper for the **50th year celebration** of *Izvestija Vyssh. Uchebn. Zaved. Matematika* 2009 N. 4, 3-19.
82. “On the power of standard information for multivariate approximation in the worst case setting,” with F. Y. Kuo and H. Woźniakowski, *J. Approximation Theory* **158** (2009), 97-125.
83. “New averaging technique for approximating weighted integrals,” with L. Plaskota and Y. Zhao, *J. Complexity* **25** (2009), 268-291.
84. “Lattice algorithms for multivariate  $L_\infty$  approximation in the worst case setting,” with F. Y. Kuo and H. Woźniakowski, *Constructive Approximation* **30** (2009), 475-493.
85. “On the power of standard information for  $L_\infty$  approximation in the randomized setting,” with F. Y. Kuo and H. Woźniakowski, *BIT Numer. Math.* **158** (2009), 543-564.
86. “The power of adaptive algorithms for functions with singularities,” with L. Plaskota, *J. of Fixed Point Theory and Applications* (2009), DOI: 10.1007/s11784-009-0121-x
87. “On decompositions of multivariate functions,” with F. Y. Kuo, I. H. Sloan, and H. Woźniakowski, *Mathematics of Computation* **79** (2010), 953-966.
88. “On the exponent of discrepancies,” with H. Woźniakowski, *Mathematics of Computation* **79** (2010), 983-992.

89. “Randomly shifted lattice rules with the optimal rate of convergence for unbounded integrands,” with F. Y. Kuo, I. H. Sloan, and B. J. Waterhouse, *J. of Complexity* **26** (2010), 135-160. DOI: 10.10.16/j.jco.2009.07.005
90. “Liberating the dimension,” with F. Y. Kuo, I. H. Sloan, and H. Woźniakowski, *J. of Complexity* **26** (2010), 422-454.
91. “Liberating the dimension for function approximation,” with H. Woźniakowski, *J. of Complexity* **27** (2011), 86-110. DOI: 10.10.16/jco.2010.08.004
92. “Liberating the dimension for function approximation: standard information,” with H. Woźniakowski, *J. of Complexity* **27** (2011), 417-440. DOI: 10.10.16/j.jco.2011.02.002
93. “Tractability of infinite-dimensional integration in the worst case and randomized settings,” with L. Plaskota, *J. of Complexity* **27** (2011), 505-518. doi:10.1016/j.jcom.2011.01.006
94. “Liberating the dimension for  $L_2$ -approximation,” *J. of Complexity* **28** (2012) 304-319.
95. “On tractability of approximation in special function spaces,” with M. Hegland, *J. Complexity* **29** (2013) 76-91. DOI: 10.1016/j.jco.2012.10.002
96. “Average case tractability of approximating  $\infty$ -variate functions,” *Mathematics of Computation*, **83** (2014), 1319-1336. DOI: <http://dx.doi.org/10.1090/S0025-5718-2013-02759-7>
97. “Adaptive algorithm for weighted approximation of singular functions over  $\mathbb{R}$ ,” with L. Plaskota and Y. Zhao, *SIAM J. Numerical Analysis*, **51** (2013), 1470-1493. DOI: 10.1137/120876897
98. “On tractability of linear tensor product problems for  $\infty$ -variate classes of functions” *J. Complexity* **29** (2013), 351-369. DOI: 10.1016/j.jco.2013.04.008
99. “Efficient algorithms for multivariate and  $\infty$ -variate integration with exponential weight,” with L. Plaskota, *Numerical Algorithms*, posted (2013). DOI: 10.1007/S11075-013-9798-4
100. Tractability of approximation of  $\infty$ -variate functions with bounded mixed partial derivatives, *J. Complexity* **30** (2014), 325-346. DOI: 10.1016/j.jco.2013.12.001
101. “On equivalence of weighted anchored and ANOVA spaces of functions with mixed smoothness of order one in  $L_1$  or  $L_\infty$  norms,” with M. Hefer and K. Ritter, *J. of Complexity* **32** (2016), 1-19. DOI: 10.1016/j.jco.2015.07.001

102. “Optimal algorithms for doubly weighted approximation of univariate functions,” with F. Y. Kuo and L. Plaskota, *J. of Approximation Theory* **201** (2016), 30-47. doi:10.1016/j.jat.2015.08.007
103. “Very low truncation dimension for high dimensional integration under modest error demand,” with P. Kritzer and F. Pillichshammer, *J. of Complexity* **35** (2016), 63-85. dx.doi.org/10.1016/j.jco.2016.02.002
104. “A note on equivalence of anchored and ANOVA spaces; lower bounds,” with P. Kritzer and F. Pillichshammer, *J. of Complexity* **38** (2017), 31-38.
105. “Equivalence of weighted anchored and ANOVA spaces of functions with mixed smoothness of order one in  $L_p$ ,” with M. Gnewuch, M. Hefter, A. Hinrichs, K. Ritter, *J. of Complexity* **40** (2017), 78-99. dx.doi.org/10.1016/j.jco.2017.01.001
106. “Infinite-dimensional integration and the multivariate decomposition method,” with F. Y. Kuo, D. Nuyens, L. Plaskota, and I. H. Sloan, *J. of Computational and Applied Mathematics* **326** (2017), 271-234.
107. “Small superposition dimension and active sets construction for multivariate integration under modest error demand,” with A. D. Gilbert, *J. of Complexity* **42** (2017), 94-109. doi.org/10.1016/j.joc.2017.03.001

## Refereed Conference Publications

108. “When is nonadaptive information as powerful as adaptive information?” with J.F. Traub and H. Woźniakowski, invited paper, *Proceedings of the 23rd IEEE Conference on Decision and Control*, 1984, 1536-1540.
109. “Average case  $\epsilon$ -complexity: A Bayesian view,” with J.B. Kadane, invited paper with discussion, *Bayesian Statistics 2* (ed. J.M. Bernardo et.al.), Proceedings of the II Valencia International Meeting on Bayesian Statistics, 1985, 361-374.
110. “Computational aspects of determining optical flow,” with D. Lee and A. Papageorgiou, *Proceedings of 2nd International Conference on Computer Vision*, Dec. 1988, 612-618.
111. “Computing optical flow,” with D. Lee and A. Papageorgiou, *Proceedings of IEEE Computer Society Workshop on Visual Motion*, March 1989.
112. “Information-based complexity; An overview,” *Proc. of the 1990 American Control Conference*, San Diego, May 1990, 374-279.
113. “On average case complexity of problems that are intractable in the worst case,” *Proc. 1992 American Control Conference*, pp. 265-269.



114. “Discontinuity detection and thresholding – a stochastic approach,” with D. Lee, *Proceedings of 1991 IEEE Conference on Computer Vision and Pattern Recognition*, pp. 204-218.
115. “On strong tractability of multivariate problems,” with H. Woźniakowski, *Proceedings of the IFIP 13th World Computer Congress*, pp. 621-628, Hamburg, Germany, August 28 – September 2, 1994.
116. “Average case complexity of weighted integration and approximation over  $\mathbf{R}^d$  for isotropic weights,” with L. Plaskota and K. Ritter, *Monte Carlo and Quasi-Monte Carlo Methods 2000*, (K.-T. Fang, F. J. Hickernell, H. Niederreiter, eds.), Springer, 2002, pp. 446-459.
117. “Tractability of approximation and integration for weighted tensor product problems over unbounded domains,” with H. Woźniakowski, *Monte Carlo and Quasi-Monte Carlo Methods 2000*, (K.-T. Fang, F. J. Hickernell, H. Niederreiter, eds.), Springer, 2002, pp. 497-522.
118. “On tractability of weighted integration for certain Banach spaces of functions,” with F. J. Hickernell and I. H. Sloan, *Monte Carlo and Quasi-Monte Carlo Methods 2002*, (H. Niederreiter, ed.), Springer, 2004, pp. 51-71.
119. “The strong tractability of multivariate integration using lattice rules,” with F. J. Hickernell and I. H. Sloan, *Monte Carlo and Quasi-Monte Carlo Methods 2002*, (H. Niederreiter, ed.), Springer, 2004, pp. 259-273.
120. “Tractability of linear multivariate problems in the average case setting,” with F. J. Hickernell and H. Woźniakowski, *Monte Carlo and Quasi-Monte Carlo Methods 2006*, (A. Keller, S. Heinrich, H. Niederreiter, eds.), 359–381, Springer, 2008.
121. “Liberating the dimension for function approximation and integration,” *Monte Carlo and Quasi-Monte Carlo Methods 2010* (L. Plaskota and H. Woźniakowski, eds.), pp. 211-231, Springer Proceedings in Math. and Stat., Springer-Verlag, Berlin, 2012.  
DOI: 10.1007/978-3-642-27440-4-9.
122. “Truncation dimension for approximation,” with P. Kritzer and F. Pillichshammer, *Ian Sloan’s 80th Birthday Festschrift*, 2018, accepted.

### **Papers Submitted for Publication:**

123. “Truncation dimension for linear problems on multivariate function spaces,” with A. Hinrichs, P. Kritzer, and F. Pillichshammer.
124. “Truncation in average and worst case settings for special classes of  $\infty$ -variate functions,” with P. Kritzer, and F. Pillichshammer.