Curriculum Vitae

Date and place of birth: 31. July 1971 in Bühl (Baden) – Germany

School Education:

Sep 1977–Aug 1981	Volksschule (primary school), Herriedenerstr. 25, Nuremberg (Germany)
Sep 1981–Jun 1982	Sigmund-Schuckert-Gymnasium, Nuremberg (Germany)
Jun 1982–Jun 1990	Staatl. Gymnasium Lauf a. d. Pegnitz (Germany)
29. June 1990	Abitur

University Education:

Oct 1990–Sep 1992	undergraduate study, University of Karlsruhe (TH), Germany
Oct 1992–Sep 1997	graduate study, University of Karlsruhe (TH), Germany
25. September 1997	diploma in mathematics

Scientific Vita:

Oct 1997–Dec 2002	sci. employee, Technical University of Chemnitz (Germany)
6. December 2001	doctorate in mathematics (supervisor: Reinhold Schneider)
Jan 2003–Sep 2003	sci. assistant, Technical University of Chemnitz (Germany)
Oct 2003–Mar 2007	sci. assistant, Christian–Albrechts–University of Kiel (Germany)
6. December 2006	habilitation in mathematics
Mar 2007–Sep 2009	associate professor, University of Bonn (Germany)
Oct 2009–Jan 2011	full professor, University of Stuttgart (Germany)
since 1. February 2011	full professor, University of Basel (Switzerland)

Stays Abroad / Lectureships / Replacement Professorships:

July+August 1999	research stay (G.N. Gatica/F. Paiva), Universidad de Concepcion (Chile)
May 2004–Mar 2005	PostDoc (R. Stevenson), Universiteit Utrecht (Netherlands)
Oct 2005–Jan 2006	lectureship, ETH Zurich (Switzerland)
Apr 2006–Sep 2006	replacement professorship (F. Otto), University of Bonn (Germany)
Oct 2006–Mar 2007	lectureship, University of Bonn (Germany)

Title of the Diploma Thesis:
Multiskalenbasierte Matrixkompression für das Galerkin-Verfahren

Title of the PhD Thesis:
Wavelet Galerkin schemes for the boundary element method in three dimensions
(honored with the *Universitätspreis 2002 der Technischen Universität Chemnitz*)

Title of the Habilitation Thesis:
Analytical and numerical methods in shape optimization

1 List of Publications

1.1 Books

1. G. Leugering, P. Benner, S. Engell, A. Griewank, H. Harbrecht, M. Hinze, R. Rannacher, S. Ulbrich: *Trends in PDE Constrained Optimization*, International Series of Numerical Mathematics, Vol. 165, Birkhäuser, Basel, 2014.

2. H. Harbrecht and M. Multerer: *Algorithmische Mathematik: Graphen, Numerik und Probabilistik*, Springer Spektrum, Berlin-Heidelberg, 2022.

1.2 Refereed and Accepted Publications

1. H. Harbrecht and R. Schneider: *Wavelet Galerkin schemes for 2D-BEM*, in *Operator Theory: Advances and Applications*, Vol. 121, edited by J. Elschner et al., Birkhäuser, Basel, 221–260 (2001).

2. H. Harbrecht, F. Paiva, C. Pérez, and R. Schneider: *Biorthogonal wavelet approximation for the coupling of FEM-BEM*, Numer. Math. 92(2):325–356 (2002).

3. H. Harbrecht, F. Paiva, C. Pérez, and R. Schneider: *Multiscale preconditioning for the coupling of FEM-BEM*, Num. Lin. Alg. Appl. 10(3):197–222 (2003).

4. H. Harbrecht, S. Pereverzev, and R. Schneider: *Self-regularization by projection for noisy pseudodifferential equations of negative order*, Numer. Math. 95(1):123–143 (2003).

5. K. Eppler and H. Harbrecht: *Numerical solution of elliptic shape optimization problems using wavelet-based BEM*, Optim. Methods Softw. 18(1):105–123 (2003).

6. G.N. Gatica, H. Harbrecht, and R. Schneider: *Least squares methods for the coupling of FEM and BEM*, SIAM J. Numer. Anal. 41(5):1974–1995 (2003).

7. H. Harbrecht, M. Konik, and R. Schneider: *Fully discrete wavelet Galerkin schemes*, Eng. Anal. Bound. Elem. 27:423–437 (2003).

8. H. Harbrecht and R. Schneider: *Adaptive wavelet Galerkin BEM*, in *Computational Fluid and Solid Mechanics 2003*, Vol. 2, edited by K.J. Bathe, Elsevier, 1982–1986 (2003).

9. H. Harbrecht and R. Schneider: *Biorthogonal wavelet bases for the boundary element method*, Math. Nachr. 269–270:167–188 (2004).

10. H. Harbrecht and R. Schneider: *Wavelet based fast solution of boundary integral equations*, in *Abstract and Applied Analysis* (Proceedings of the International Conference in Hanoi, 2002), edited by N.M. Chuong et al., World Scientific Publishing Company, 139–162 (2004).

11. K. Eppler and H. Harbrecht: *Exterior electromagnetic shaping using wavelet BEM*, Math. Meth. Appl. Sci. 28:387–405 (2005).

12. K. Eppler and H. Harbrecht: *Second order Lagrange multiplier approximation for constrained shape optimization problems*, in *Control and Boundary Analysis*, Lecture Notes in Pure and Applied Mathematics, Vol. 240, edited by J. Cagnol and J.P. Zolesio, Dekker/CRC Press, 107–118 (2005).

13. K. Eppler and H. Harbrecht: *Fast wavelet BEM for 3d electromagnetic shaping*, Appl. Numer. Math. 54:537–554 (2005).

14. K. Eppler and H. Harbrecht: *A regularized Newton method in electrical impedance tomography using shape Hessian information*, Control Cybern. 34:203–225 (2005).

15. H. Harbrecht, U. Kähler, and R. Schneider: *Wavelet Galerkin BEM on unstructured meshes*, Comput. Vis. Sci. 8:189–199 (2005).

16. K. Eppler and H. Harbrecht: *Second order shape optimization using wavelet BEM*, Optim. Methods Softw. 21(1):135–153 (2006).

17. W. Dahmen, H. Harbrecht, and R. Schneider: *Compression techniques for boundary integral equations. Optimal complexity estimates*, SIAM J. Numer. Anal. 43(6): 2251–2271 (2006).

18. H. Harbrecht and R. Schneider: *Wavelet Galerkin schemes for boundary integral equations. Implementation and quadrature*, SIAM J. Sci. Comput. 27(4):1347–1370 (2006).

19. K. Eppler and H. Harbrecht: *Efficient treatment of stationary free boundary problems*, Appl. Numer. Math. 56:1326–1339 (2006).

20. K. Eppler and H. Harbrecht: *Coupling of FEM and BEM in shape optimization*, Numer. Math., 104:47–68 (2006).

21. H. Harbrecht and R. Stevenson: *Wavelets with patchwise cancellation properties*, Math. Comput. 75:1871–1889 (2006).

22. T. Gantamur, H. Harbrecht, and R. Stevenson: *An optimal adaptive wavelet method without coarsening of the iterands*, Math. Comput. 76:615–629 (2007).

23. K. Eppler, H. Harbrecht, and R. Schneider: *On convergence in elliptic shape optimization*, SIAM J. Control Optim. 45(1):61–83 (2007).

24. K. Eppler and H. Harbrecht: *Shape optimization for 3D electrical impedance tomography*, in *Free and Moving Boundaries: Analysis, Simulation and Control*, Lecture Notes in Pure and Applied Mathematics, Vol. 252, edited by R. Glowinski and J.P. Zolesio, Dekker/CRC Press, 165–184 (2007).

25. W. Dahmen, H. Harbrecht, and R. Schneider: *Adaptive methods for boundary integral equations. Complexity and convergence estimates*, Math. Comput. 76:1243–1274 (2007).

26. H. Harbrecht and T. Hohage: *Fast methods for three-dimensional inverse obstacle scattering*, J. Integral Equations Appl. 19(3):237–260 (2007).

27. K. Eppler and H. Harbrecht: *Compact gradient tracking in shape optimization*, Comput. Optim. Appl. 39(3):297–318 (2008).

28. K. Eppler, H. Harbrecht, and M. Mommer: *A new fictitious domain method in shape optimization*, Comput. Optim. Appl. 40(2):281–298 (2008).

29. H. Harbrecht: *Analytical and numerical methods in shape optimization*, Math. Meth. Appl. Sci. 31(18):2095–2114 (2008).

30. K. Eppler and H. Harbrecht: *Wavelet based boundary element methods in exterior electromagnetic shaping*, Eng. Anal. Bound. Elem. 32:645–657 (2008).

31. H. Harbrecht, R. Schneider, and C. Schwab: *Sparse second moment analysis for elliptic problems in stochastic domains*, Numer. Math. 109(3):167–188 (2008).

32. H. Harbrecht: *A Newton method for Bernoulli's free boundary problem in three dimensions*, Computing 82(1):11–30 (2008).

33. H. Harbrecht, R. Schneider, and C. Schwab: *Multilevel frames for sparse tensor product spaces*, Numer. Math. 110(2):199–220 (2008).

34. H. Harbrecht and T. Hohage: *A Newton method for reconstructing non star-shaped domains in electrical impedance tomography*, Inverse Probl. Imaging 3(2): 353–371 (2009).

35. H. Harbrecht: *On the numerical solution of Plateau's problem*, Appl. Numer. Math. 59(11):2785–2800 (2009).

36. H. Harbrecht and M. Randrianarivony: *Wavelet BEM on molecular surfaces — parametrization and implementation*, Computing 86(1):1–22 (2009).

37. K. Eppler and H. Harbrecht: *Tracking Neumann data for stationary free boundary problems*, SIAM J. Control Optim. 48(5):2901–2916 (2009).

38. H. Harbrecht and M. Randrianarivony: *From computer aided design to wavelet BEM*, Comput. Vis. Sci. 13(2):69–82 (2010).

39. H. Harbrecht: *On output functionals of boundary value problems on stochastic domains*, Math. Meth. Appl. Sci. 33(1):91–102 (2010).

40. H. Harbrecht: *A finite element method for elliptic problems with stochastic input data*, Appl. Numer. Math. 60:227–244 (2010).

41. K. Eppler and H. Harbrecht: *Tracking Dirichlet data in L^2 is an ill-posed problem*, J. Optim. Theory Appl. 145(1):17–35 (2010).

42. W. Weijo, M. Randrianarivony, H. Harbrecht, and L. Frediani: *Wavelet formulation of the polarizable continuum model*, J. Comput. Chem. 31(7):1469–1477 (2010).

43. H. Harbrecht: *Finite element based second moment analysis for elliptic problems in stochastic domains*, in *Numerical Mathematics and Advanced Applications. Proceedings of ENUMATH 2009*, edited by G. Kreiss et al., Springer, Berlin-Heidelberg, 433–442 (2010).

44. H. Harbrecht and J. Tausch: *An efficient numerical method for a shape identification problem arising from the heat equation*, Inverse Problems 27(6):065013 (2011).

45. H. Harbrecht and M. Randrianarivony: *Wavelet BEM on molecular surfaces — solvent excluded surfaces.* Computing 92(4):335–364 (2011).

46. H. Harbrecht and C. Schwab: *Sparse tensor finite elements for elliptic multiple scale problems*, Comput. Methods Appl. Mech. Engrg. 200(45-46):3100–3110 (2011).

47. H. Harbrecht: *On analytical derivatives for geometry optimization in the polarizable continuum model*, J. Math. Chem. 49(9):1928–1936 (2011).

48. K. Eppler and H. Harbrecht: *Shape optimization for free boundary problems — analysis and numerics*, in *Constrained Optimization and Optimal Control for Partial Differential Equations*, International Series of Numerical Mathematics, Vol. 160, edited by G. Leugering et al., Birkhäuser, Basel, 277–288 (2012).

49. H. Harbrecht, M. Peters, and R. Schneider: *On the low-rank approximation by the pivoted Cholesky decomposition*, Appl. Numer. Math. 62(4):428–440 (2012).

50. H. Harbrecht, W.L. Wendland, and N. Zorii: *On Riesz minimal energy problems*, J. Math. Anal. Appl. 393(2):397–412 (2012).

51. K. Eppler and H. Harbrecht: *On a Kohn-Vogelius like formulation of free boundary problems*, Comput. Optim. Appl. 52(1):69–85 (2012).

52. H. Harbrecht: *Preconditioning of wavelet BEM by the incomplete Cholesky factorization*, Comput. Visual. Sci. 15(6):319–329 (2012).

53. H. Harbrecht, M. Peters, and M. Siebenmorgen: *On multilevel quadrature for elliptic stochastic partial differential equations*, in *Sparse grids and applications*, Lecture Notes in Computational Science and Engineering, Vol. 88, edited by J. Garcke and M. Griebel, Springer, Berlin-Heidelberg, 161–179 (2013).

54. M. Griebel and H. Harbrecht: *On the construction of sparse tensor product spaces*, Math. Comput. 82(282):975–994, (2013).

55. H. Harbrecht and J. Tausch: *On the numerical solution of an inverse shape optimization problem for the heat equation.* SIAM J. Sci. Comput. 35(1):A104–A121 (2013).

56. H. Harbrecht and M. Peters: *Comparison of fast boundary element methods on parametric surfaces*, Comput. Methods Appl. Mech. Engrg. 261–262:39–55 (2013).

57. A. Buffa, H. Harbrecht, A. Kunoth, and G. Sangalli: *BPX-preconditioning for isogeometric analysis*, Comput. Methods Appl. Mech. Engrg. 265:63–70 (2013).

58. H. Harbrecht, M. Peters, and M. Siebenmorgen: *Combination technique based k-th moment analysis of elliptic problems with random diffusion*, J. Comput. Phys. 252:128–141 (2013).

59. H. Harbrecht and J. Li: *First order second moment analysis for stochastic interface problems based on low-rank approximation*, ESAIM Math. Model. Numer. Anal. 47(5):1533–1552 (2013).

60. M. Griebel and H. Harbrecht: *A note on the construction of L-fold sparse tensor product spaces*, Constr. Approx. 38(2):235–251 (2013).

61. M. Griebel and H. Harbrecht: *Approximation of bi-variate functions: singular value decomposition versus sparse grids*, IMA J. Numer. Anal. 34(1):28–54 (2014).

62. H. Harbrecht, W.L. Wendland, and N. Zorii: *Riesz minimal energy problems on $C^{k-1,1}$-manifolds*, Math. Nachr. 287(1):48–69 (2014).

63. D. Alm, H. Harbrecht, and U. Krämer: *The $\mathcal{H}^2$-wavelet method*, J. Comput. Appl. Math. 267:131–159 (2014).

64. J. Fender, L. Graff, H. Harbrecht, and M. Zimmermann: *Key parameters in high-dimensional systems with uncertainty*, J. Mech. Design 136(4):041007 (2014).

65. M. Griebel and H. Harbrecht: *On the convergence of the combination technique*, in *Sparse grids and applications – Munich 2012*, Lecture Notes in Computational Science and Engineering, Vol. 97, edited by J. Garcke and D. Pflüger, Springer, Berlin-Heidelberg, 55–74 (2014).

66. H. Harbrecht and G. Mitrou: *Improved trial methods for a class of generalized Bernoulli problems*, J. Math. Anal. Appl. 420(1):177–194 (2014).

67. H. Harbrecht and J. Tausch: *On shape optimization with parabolic state equation*, in *Trends in PDE Constrained Optimization*, International Series of Numerical Mathematics, Vol. 165, edited by G. Leugering et al., Birkhäuser, Basel, 213–229 (2014).

68. H. Harbrecht, M. Peters, and M. Siebenmorgen: *Efficient approximation of random fields for numerical applications*, Num. Lin. Alg. Appl. 22(4):596–617 (2015).

69. H. Harbrecht and G. Mitrou: *Stabilization of the trial method for the Bernoulli problem in case of prescribed Dirichlet data*, Math. Meth. Appl. Sci. 38(13):2850–2863 (2015).

70. M. Dambrine, H. Harbrecht, and B. Puig: *Computing quantities of interest for random domains with second order shape sensitivity analysis*, ESAIM Math. Model. Numer. Anal. 49(5):1285–1302 (2015).

71. J. Dölz, H. Harbrecht, and M. Peters: *$\mathcal{H}$-matrix accelerated second moment analysis for potentials with rough correlation*, J. Sci. Comput. 65(1):387–410 (2015).

72. M. Dambrine, C. Dapogny, and H. Harbrecht: *Shape optimization for quadratic functionals and states with random right-hand sides*, SIAM J. Control Optim. 53(5):3081–3103 (2015).

73. M. Bugeanu, R. Di Remigio, K. Mozgawa, S. Reine, H. Harbrecht, and L. Frediani: *Wavelet formulation of the polarizable continuum model. II. Use of piecewise bilinear boundary elements*, Phys. Chem. Chem. Phys. 17:31566–31581 (2015).

74. M. Bugeanu and H. Harbrecht: *A second order convergent trial method for a free boundary problem in three dimensions*, Interfaces Free Bound. 17(4):517–537 (2015).

75. H. Harbrecht and F. Loos: *Optimization of current carrying multicables*, Comput. Optim. Appl. 63(1):237–271 (2016).

76. H. Harbrecht, and M. Peters: *Combination technique based second moment analysis for elliptic PDEs on random domains*, in *Sparse grids and applications – Stuttgart 2014*, Lecture Notes in Computational Science and Engineering, Vol. 109, edited by J. Garcke and D. Pflüger, Springer International Publishing, Switzerland, 51-77 (2016).

77. M. Dambrine, I. Greff, H. Harbrecht, and B. Puig: *Solution of the Poisson equation with a thin layer of random thickness*, SIAM J. Numer. Anal. 54(2):921–941 (2016).

78. H. Harbrecht, M. Peters, and M. Siebenmorgen: *Multilevel accelerated quadrature for PDEs with log-normally distributed random coefficient*, SIAM/ASA J. Uncertain. Quantif. 4(1):520–551 (2016).

79. H. Harbrecht and R. Schneider: *A note on multilevel based error estimation*, Comput. Methods Appl. Math. 16(3):447-458 (2016).

80. H. Harbrecht, W.L. Wendland, and N. Zorii: *Rapid solution of minimal Riesz energy problems*, Numer. Methods Partial Differential Equations 32(6):1535–1552 (2016).

81. L. Graff, H. Harbrecht, and M. Zimmermann: *On the computation of solution spaces in high dimensions*, Struct. Multidiscip. Optim. 54(4):811–829, 2016.

82. H. Harbrecht, M. Peters, and M. Siebenmorgen: *Analysis of the domain mapping method for elliptic diffusion problems on random domains*, Numer. Math. 134(4):823–856 (2016).

83. J. Dölz, H. Harbrecht, and M. Peters: *An interpolation-based fast multipole method for higher order boundary elements on parametric surfaces*, Int. J. Numer. Meth. Eng. 108(13):1705–1728 (2016).

84. M. Dambrine, I. Greff, H. Harbrecht, and B. Puig: *Numerical solution of the homogeneous Neumann boundary value problem on domains with a thin layer of random thickness*, J. Comput. Phys. 330:943–959 (2017).

85. H. Harbrecht, M. Peters, and M. Siebenmorgen: *On the Quasi-Monte Carlo quadrature with Halton points for elliptic PDEs with log-random diffusion*, Math. Comput. 86:771–797 (2017).

86. J. Dölz, H. Harbrecht, and C. Schwab: *Covariance regularity and $\mathcal{H}$-matrix approximation for rough random fields*, Numer. Math. 135(4):1045–1071 (2017).

87. H. Harbrecht, and M. Peters: *Solution of free boundary problems in the presence of geometric uncertainties*, in *Topological Optimization and Optimal Transport in the Applied Sciences*, edited by M. Bergounioux et al., de Gruyter, Berlin-Bosten, 20–39 (2017).

88. J. Dölz, H. Harbrecht, and M. Peters: *$\mathcal{H}$-matrix based second moment analysis for rough random fields and finite element discretizations*, SIAM J. Sci. Comput. 39(4):B618–B639 (2017).

89. H. Harbrecht, M. Peters, and M. Schmidlin. *Uncertainty quantification for PDEs with anisotropic random diffusion*, SIAM J. Numer. Anal. 55(2):1002–1023 (2017).

90. M. Dambrine, H. Harbrecht, M. Peters, and B. Puig: *On Bernoulli's free boundary problem with a random boundary*, J. Uncertain. Quantif. 7(4):335–353 (2017).

91. H. Harbrecht and M. Utzinger: *On adaptive wavelet boundary element methods*, J. Comput. Math. 36(1):90–109 (2018).

92. J. Dölz, H. Harbrecht, S. Kurz, S. Schöps, and F. Wolf: *A fast isogeometric BEM for the three dimensional Laplace- and Helmholtz problems*, Comput. Methods Appl. Mech. Engrg. 330:83–101 (2018).

93. H. Harbrecht and M. Peters: *The second order perturbation approach for PDEs on random domains.* Appl. Numer. Math. 125:159–171 (2018).

94. H. Harbrecht, W.L. Wendland, and N. Zorii: *Minimal energy problems for strongly singular Riesz kernels*, Math. Nachr. 291(1):55–85 (2018).

95. S. Dahlke, H. Harbrecht, M. Utzinger, and M. Weimar: *Adaptive wavelet BEM for boundary integral equations. Theory and numerical experiments*, Numer. Funct. Anal. Optim., 39(2):208–232 (2018).

96. Ch. Bürli, H. Harbrecht, P. Odermatt, S. Sayasone, and N. Chitnis: *Mathematical analysis of the transmission dynamics of the liver fluke, Opisthorchis viverrini*, J. Theoret. Biol., 439:181–194 (2018).

97. A.-L. Haji-Ali, H. Harbrecht, M. Peters, and M. Siebenmorgen: *Novel results for the anisotropic sparse quadrature*, J. Complexity 47:62–85 (2018).

98. R. Brügger, R. Croce, and H. Harbrecht: *Solving a free boundary problem with non-constant coefficients*, Math. Meth. Appl. Sci. 41(10):3653–3671 (2018).

99. J. Dölz and H. Harbrecht: *Hierarchical matrix approximation for the uncertainty quantification of potentials on random domains*, J. Comput. Phys. 371:506–527 (2018).

100. H. Harbrecht and J. Tausch: *A fast sparse grid based space-time boundary element method for the nonstationary heat equation*, Numer. Math. 140(1):239–264 (2018).

101. Ch. Bürli, H. Harbrecht, P. Odermatt, S. Sayasone, and N. Chitnis: *Analysis of interventions against the liver fluke, Opisthorchis viverrini*, Math. Biosci. 303:115–125 (2018).

102. M. Bugeanu and H. Harbrecht: *Parametric representation of molecular surfaces*, Int. J. Quantum Chem. 119:e25695 (2019).

103. P. Balazs and H. Harbrecht: *Frames for the solution of operator equations in Hilbert spaces with fixed dual pairing*, Numer. Funct. Anal. Optim. 40(1):65–84 (2019).

104. H. Harbrecht and P. Zaspel: *On the algebraic construction of sparse multilevel approximations of elliptic tensor product problems*, J. Sci. Comput. 78(2):1272–1290 (2019).

105. J. Dölz, H. Harbrecht, and M.D. Multerer: *On the best approximation of the hierarchical matrix product*, SIAM J. Matrix Anal. Appl. 40(1):147–174 (2019).

106. H. Harbrecht, N. Ilić, and M.D. Multerer: *Rapid computation of far-field statistics for random obstacle scattering*, Eng. Anal. Bound. Elem. 101:243–251 (2019).

107. P. Zaspel, B. Huang, H. Harbrecht, and O.A. von Lilienfeld: *Boosting quantum machine learning models with multi-level combination technique: Pople diagrams revisited*, J. Chem. Theory Comput. 15(3):1546–1559 (2019).

108. F. Caubet, M. Dambrine, and H. Harbrecht: *A new method for the data completion problem and application to obstacle detection*, SIAM J. Appl. Anal. 79(1):415–435 (2019).

109. J. Dölz and T. Gerig, M. Lüthi, H. Harbrecht and T. Vetter: *Efficient computation of low-rank Gaussian process models for surface and image registration*, J. Math. Imaging Vision 61(4):443–457 (2019).

110. H. Harbrecht and M. Moor: *Wavelet boundary element methods. Adaptivity and goal-oriented error estimation*, in *Advanced Finite Element Methods with Applications*, Lecture Notes in Computational Science and Engineering, Vol. 128, edited by T. Apel et al., Springer Nature, Switzerland, 143–164 (2019).

111. H. Harbrecht, D. Tröndle, and M. Zimmermann: *A sampling-based optimization algorithm for solution spaces with pair-wise coupled design variables*, Struct. Multidiscip. Optim. 60(2):501–512 (2019).

112. K. Eppler, H. Harbrecht, S. Schlenkrich, and A. Walther: *Exterior electromagnetic shaping: AD-based computation of shape derivatives*, J. Math. Study 52(3):227–243 (2019).

113. M. Griebel and H. Harbrecht: *Singular value decomposition versus sparse grids. Refined complexity estimates*, IMA J. Numer. Anal. 39(4):1652–1671 (2019).

114. M. Dambrine, H. Harbrecht, and B. Puig: *Incorporating knowledge on the measurement noise in electrical impedance tomography*, ESAIM Control Optim. Calc. Var. 25:84 (2019).

115. H. Harbrecht and M. Schmidlin. *Multilevel methods for uncertainty quantification of elliptic PDEs with random anisotropic diffusion*, Stoch. Partial Differ. Equ. Anal. Comput. 8(1):54–81 (2020).

116. R. Brügger, R. Croce, and H. Harbrecht: *Solving a Bernoulli type free boundary problem with random diffusion*, ESAIM Control Optim. Calc. Var. 26:56 (2020).

117. M. Griebel, H. Harbrecht, and M.D. Multerer: *Multilevel quadrature for elliptic parametric partial differential equations in case of polygonal approximations of curved domains*, SIAM J. Numer. Anal. 58(1):684–705 (2020).

118. J. Dölz, H. Harbrecht, S. Kurz, M.D. Multerer, S. Schöps, and F. Wolf: *Bembel: The fast isogeometric boundary element C++ library for Laplace, Helmholtz, and electric wave equation*, SoftwareX 11:100476 (2020).

119. M. Dambrine and H. Harbrecht: *Shape optimization for composite materials and scaffolds*, Multiscale Model. Sim. 18(2):1136–1152 (2020).

120. H. Harbrecht, J.D. Jakeman, and P. Zaspel: *Cholesky-based experimental design for Gaussian process and kernel-based emulation and calibration*, Commun. Comput. Phys. 29:1152–1185 (2021).

121. H. Harbrecht and M.D. Multerer: *A fast direct solver for nonlocal operators in wavelet coordinates*, J. Comput. Phys. 428:110056 (2021).

122. R. Brügger, H. Harbrecht, and J. Tausch: *On the numerical solution of a time-dependent shape optimization problem for the heat equation*, SIAM J. Control Optim. 59(2):931–953 (2021).

123. H. Harbrecht, D. Tröndle, and M. Zimmermann: *Approximating solution spaces as a product of polygons*, Struct. Multidiscip. Optim. 64(4):2225–2242 (2021).

124. H. Harbrecht and I. Kalmykov: *Sparse grid approximation of the Riccati operator for closed loop parabolic control problems with Dirichlet boundary control*, SIAM J. Control Optim. 59(6):4538–4562 (2021).

125. J. Dölz, H. Harbrecht, C. Jerez-Hanckes, and M.D. Multerer: *Isogeometric multilevel quadrature for forward and inverse random acoustic scattering*, Comput. Methods Appl. Mech. Engrg. 388:114242 (2022).

126. H. Harbrecht, M. Multerer, and R. von Rickenbach: *Isogeometric shape optimization for scaffold structures*, Comput. Methods Appl. Mech. Engrg.. 391:114552 (2022).

127. R.C. Brügger and H. Harbrecht: *On the reformulation of the classical Stefan problem as a shape optimization problem*, SIAM J. Control Optim. 60(1):310–329 (2022).

128. R. Brügger, H. Harbrecht, and J. Tausch: *Boundary integral operators for the heat equation in time-dependent domains*, Integr. Equ. Oper. Theory 94:10 (2022).

129. S. Dahlke, H. Harbrecht, and T.M. Surowiec: *A wavelet-based approach for the optimal control of non-local operator equations*, SIAM J. Sci. Comput. 44(4):A2691–A2708 (2022).

130. H. Harbrecht and M. Multerer: *Samplets: Construction and scattered data compression*, J. Comput. Phys., 471:111616 (2022).

131. H. Harbrecht and M. Schmidlin: *Multilevel quadrature for elliptic problems on random domains by the coupling of FEM and BEM*, Stoch. Partial Differ. Equ. Anal. Comput. 10:1619–1650 (2022).

132. M. Griebel and H. Harbrecht: *Analysis of tensor approximation schemes for continuous functions*, Found. Comput. Math. 23(1):219–240 (2023).

133. M. Dambrine, H. Harbrecht, and B. Puig: *Bernoulli free boundary problems under uncertainty: the convex case*, Comput. Methods Appl. Math. 23(2):333–352 (2023).

134. M. Griebel, H. Harbrecht, and R. Schneider: *Low-rank approximation of continuous functions in Sobolev spaces with dominating mixed smoothness*, Math. Comput. 92:1729–1746 (2023).

135. M. Fallahpour and H. Harbrecht: *Shape optimization for composite materials in linear elasticity*, Optim. Eng. 24(3):2115–2143 (2023).

1.3 Submitted Publications

1. H. Harbrecht and P. Zaspel: *A scalable $\mathcal{H}$-matrix approach for the solution of boundary integral equations on multi-GPU clusters*, Preprint 2018-11, Fachbereich Mathematik, Universität Basel, Switzerland, 2018.

2. Ch. Bürli, H. Harbrecht, P. Odermatt, S. Sayasone, and N. Chitnis: *Age dependency in the transmission dynamics of the liver fluke, Opisthorchis viverrini and the effectiveness of interventions*, Preprint 2019-11, Fachbereich Mathematik, Universität Basel, Switzerland, 2019.

3. H. Harbrecht, L. Herrmann, K. Kirchner, and Ch. Schwab: *Multilevel approximation of Gaussian random fields: Covariance compression, estimation and spatial prediction.* SAM-Report 2021-09, ETH Zurich, Switzerland, 2021.

4. S. Ben Bader, H. Harbrecht, R. Krause, M. Multerer, A. Quaglino, and M. Schmidlin: *Space-time multilevel quadrature methods and their application for cardiac electrophysiology.* arXiv:2105.02007, 2021.

5. H. Hakula, H. Harbrecht, V. Kaarnioja, F.Y. Kuo, and I.H. Sloan: *Uncertainty quantification for random domains using periodic random variables.* arXiv:2210.17329, 2022.

6. H. Harbrecht, M. Multerer, O. Schenk, and Ch. Schwab: *Multiresolution kernel matrix algebra.* arXiv:2211.11681, 2022.

7. L.N. Felber, H. Harbrecht, and M. Schmidlin: *Identification of sparsely representable diffusion parameters in elliptic problems.* Preprint 2023-03, Fachbereich Mathematik, Universität Basel, Switzerland, 2023.

8. H. Harbrecht and R. von Rickenbach: Compression of boundary integral operators discretized by anisotropic wavelet bases. Preprint 2023-04, Fachbereich Mathematik, Universität Basel, Switzerland, 2023.

9. L. Kamber, Ch. Bürli, H. Harbrecht, P. Odermatt, S. Sayasone, and N. Chitnis: *Capturing heterogeneity in Opisthorchis viverrini epidemiology and control.* medRxiv, 2023.

10. H. Harbrecht, V. Karnaev, and M. Schmidlin: *Quantifying domain uncertainty in linear elasticity.* Preprint 2023-06, Fachbereich Mathematik, Universität Basel, Switzerland, 2023.

11. D. Baroli, H. Harbrecht, and M. Multerer. *Samplet basis pursuit.* arXiv:2306.10180, 2023.

12. J. Dölz, H. Harbrecht, and M. Multerer. *Solving acoustic scattering problems by the isogeometric boundary element method.* arXiv:2306.11324, 2023.

1.4 Further Publications

1. H. Harbrecht and R. Schneider: *Wavelets for the fast solution of boundary integral equations*, in *Proceedings of the Fifth World Congress on Computational Mechanics (WCCM V), July 7–12, 2002, Vienna, Austria*, edited by H.A. Mang, F.G. Rammerstorfer, and J. Eberhardsteiner, Publisher: Vienna University of Technology, Austria (non-refereed conference paper).

2. H. Harbrecht: *Shape optimization using wavelet BEM*, Oberwolfach Reports 1(3):1809–1811 (2004).

3. H. Harbrecht, U. Kähler, and R. Schneider: *Fast wavelet BEM on complex geometries*, PAMM (Proceedings of the GAMM Conference 2005), 5:767–768 (2005).

4. H. Harbrecht, U. Kähler, and R. Schneider: *Wavelet matrix compression for boundary integral equations*, in *Parallel Algorithms and Cluster Computing*, Lecture Notes in Computational Science and Engineering, Vol. 52, edited by K.-H. Hoffmann and A. Meyer, Springer, Berlin-Heidelberg-New York, 129–149 (2006) (invited contribution).

5. H. Harbrecht: *Sparse second moment analysis for elliptic problems in stochastic domains*, Oberwolfach Reports 4(3):2111–2113 (2007).

6. L. Afraites, M. Dambrine, K. Eppler, H. Harbrecht, and D. Kateb: *On second order shape optimization methods*, in *Proceedings of the International Conference on System Theory: Modeling, Analysis and Control, May 25–28, 2009, Fes, Morocco.* Presses Universitaires des Perpignan, Perpignan, France, 399–407 (2009) (non-refereed conference paper).

7. K. Eppler and H. Harbrecht: *Shape optimization for free boundary problems*, in *Proceedings of the International Conference on System Theory: Modeling, Analysis and Control, May 25–28, 2009, Fes, Morocco.* Presses Universitaires des Perpignan, Perpignan, France, 457–464 (2009) (non-refereed conference paper).

8. H. Harbrecht and R. Schneider: *Rapid solution of boundary integral equations by wavelet Galerkin schemes*, in *Multiscale, Nonlinear and Adaptive Approximation*, edited by R. DeVore and A. Kunoth, Springer, Berlin-Heidelberg, 249–294 (2009) (invited contribution).

9. H. Harbrecht: *On error estimation in FEM without having Galerkin orthogonality*, Oberwolfach Reports 7(3):1979–1982 (2010).

10. H. Harbrecht: *Shape optimization for free boundary problems*, Oberwolfach Reports 8(1):215–218 (2011).

11. H. Harbrecht: *Modelling and simulation of elliptic PDEs on random domains*, Oberwolfach Reports 10(1):250–254 (2013).

12. H. Harbrecht: *Multilevel quadrature for elliptic stochastic partial differential equations*, Oberwolfach Reports 10(3):2212–2215 (2013).

13. H. Harbrecht: *Second moment analysis for Robin boundary value problems on random domains*, in *Singular Phenomena and Scaling in Mathematical Models*, edited by M. Griebel, Springer, Berlin-Heidelberg, 361–382 (2014) (invited contribution).

14. H. Harbrecht: *Sparse BEM for the heat equation*, Oberwolfach Reports 12(1):124–126 (2015).

15. H. Harbrecht: *On fast boundary element methods for parametric surfaces*, Oberwolfach Reports 13(1):355–356 (2016).

16. H. Harbrecht: *On shape optimization with parabolic state equation*, Oberwolfach Reports 14(1):184–185 (2017).

17. H. Harbrecht: *Novel results for the anisotropic sparse grid quadrature*, Oberwolfach Reports 14(1):1023–1026 (2017).

18. M.E. Vogt, F. Duddeck, H. Harbrecht, F. Stutz, M. Wahle, and M. Zimmermann: *Computing solution-compensation spaces using an enhanced Fourier-Motzkin algorithm*, PAMM (Proceedings of the GAMM Conference 2018), 18:e201800103 (2018).

19. H. Harbrecht: *Shape optimization under uncertainty*, Oberwolfach Reports 15(3): 2350–2352 (2018).

20. H. Harbrecht: *About a fast isogeometric boundary element method*, Oberwolfach Reports, 16(3):1997–2000 (2019).

21. H. Harbrecht: *A wavelet-based approach for the optimal control of nonlocal operator equations*, Oberwolfach Reports, 17(1):326–329 (2020).

2 List of Presentations

2.1 Presentations at Conferences and Workshops

1. 4. Südostdeutsches Kolloquium, Cottbus (Germany), 17.4.1998: *Konstruktion von Waveletbasen auf Gebieten im $\mathbb{R}^2$.*

2. 10th Anniversary International GAMM-Workshop on Multigrid Methods, Bonn (Germany), 5.–8.10.1998: *Construction of globally continuous biorthogonal wavelet bases on domains in $\mathbb{R}^2$.*

3. BMBF-Workshop: Effective Methods for BEM Matrices, organized by S. Rjasanow and W.L. Wendland, Saarbrücken (Germany), 26.–27.11.1998: *Construction of globally continuous biorthogonal wavelet bases on manifolds in $\mathbb{R}^3$.*

4. IX. Congreso de Matematica Capricornio, Antofagasta (Chile), 4.–8.8.1999: *Wavelet based fast solution of BEM.*

5. Workshop on FEM-BEM Kopplung: Schnelle Algorithmen und ihre Implementierung, Hirschegg (Austria), 1.–4.6.2000: *Wavelet based fast solution of BEM.*

6. 6. Südostdeutsches Kolloquium, Chemnitz (Germany), 5.5.2000: *Biorthogonal wavelet approximation for the coupling of FEM-BEM.*

7. First SIAM-EMS Conference: Applied Mathematics in our Changing World, Berlin (Germany), 2.–6.9.2001, Mini-Symposium "Shape Calculus and Relaxation Methods in Domain Optimization": *Application of wavelet-based BEM-methods for the study of shape optimization problems in elasticity.*

8. Mini-Workshop: Algorithms for the Arithmetic of Dense Matrices from BEM/FEM, organized by W. Hackbusch, Oberwolfach (Germany), 8.–14.7.2001: *Wavelet based fast solution of BEM.*

9. Chemnitzer FEM-Symposium 2002, Ehrenfriedersdorf/Chemnitz (Germany), 23.–25.9.2002: *Wavelet based fast solution of BEM.*

10. BMBF-Workshop: Boundary Element Methods – Modern Algorithms and Industrial Applications, organized by S. Rjasanow and W.L. Wendland, Saarbrücken (Germany), 30.9.–2.10.2002: *Wavelet based fast solution of BEM.*

11. Mini-Workshop of the IHP-Network Breaking Complexity: Shape Optimization and Multiscale Methods, Bonn (Germany), 28.–29.7.2003: *Shape optimization using wavelet BEM.*

12. 1st Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 15.–18.10.2003: *Shape optimization using wavelet BEM.*

13. WONAPDE 2004 (First Chilean Workshop on Numerical Analysis of Partial Differential Equations), Concepcion (Chile), 13.–16.1.2004, Mini-Symposium "Wavelet Methods in Numerical Analysis: Recent Developments": *Shape optimization using wavelet BEM.*

14. 20th GAMM–Seminar Leipzig on Numerical Methods for Non-Local Operators, MPI for Mathematics in the Sciences, Leipzig (Germany), 22.–24.1.2004: *Shape optimization using wavelet BEM.*

15. 75. GAMM Jahrestagung, Dresden (Germany), 22.–26.3.2004, Section "Numerical Analysis": *Shape optimization using wavelet BEM.*

16. ECMI 2004 (European Conference on Mathematics for Industry), Eindhoven (Netherlands), 21.–25.6.2004, Mini-Symposium "Wavelets and its application": *Shape optimization using wavelet BEM.*

17. Workshop: Wavelets and Multiscale Methods, organized by A. Cohen, W. Dahmen, R. DeVore, and A. Kunoth, Oberwolfach (Germany), 11.–17.7.2004: *Shape optimization using wavelet BEM.*

18. ECCOMAS 2004 (European Conference on Computational Methods in Applied Sciences and Engeneering), Jyväskylä (Finnland), 24.–28.7.2004, Mini-Symposium "Efficient boundary element equation methods in engineering and industrial applications": *Wavelet based fast solution of BEM.*

19. Mid-term meeting of the IHP-Network "Breaking Complexity", Pavia (Italy), 9.–10.12.2004: *Adaptive wavelet BEM.*

20. Workshop "Hierarchie und Approximation", organized by J. Prestin, R. Schneider and A. Srivastav, Kiel (Germany), 14.–15.3.2005: *Shape optimization using wavelet BEM.*

21. 26. Norddeutsches Kolloquium über Angewandte Analysis und Numerische Mathematik, Braunschweig (Germany), 3.–4.6.2005: *Shape optimization using wavelet BEM.*

22. BICOM Workshop on Boundary Elements, Brunel University, West London (England), 16.–17.6.2005: *Adaptive wavelet boundary element methods.*

23. AIP 2005 (Applied Inverse Problems), Cirencester (England), 26.–30.6.2005, Mini-Symposium "Computational methods for parameter identification in PDEs": *Fast methods in 3D inverse obstacle scattering.*

24. Chemnitzer FEM-Symposium 2005, Schöneck/Vogtland (Germany), 19.–21.9.2005: *Adaptive wavelet Galerkin BEM.*

25. Workshop TiSCoPDE05 (New Trends in Simulation and Control of PDEs) Weierstrass Institute for Applied Analysis and Stochastics, Berlin (Germany), 26.–28.9.2005: *Fast wavelet BEM for 3d electromagnetic shaping* (invited talk).

26. MAFELAP 2006 (The Mathematics of Finite Elements and Applications), Brunel University, West London (England), 13.–16.6.2006, Mini-Symposium "Boundary Element Methods: Theory and Applications": *Fast BEM in shape optimization.*

27. Final meeting of the IHP-Network Breaking Complexity, Vienna (Austria), 14.–16.9. 2006: *Sparse second moment analysis for potentials on stochastic domains.*

28. DMV-Jahrestagung 2006, Bonn (Germany), 18.–22.9.2006, Mini-Symposium "Numerics for PDE-Constrained Control Problems": *Shape optimization for elliptic PDEs* (invited talk).

29. 4th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 29.9.–2.10.2006: *Sparse second moment analysis for potentials on stochastic domains.*

30. Boundary Elements – Theory and Applications (BETA 2007), Hannover (Germany), 22.–24.5.2007: *Sparse second moment analysis for potentials on stochastic domains.*

31. CMM 2007 (17th international conference on computer methods in mechanics), Lodz-Spala (Poland), 19.–22.6.2007, Mini-Symposium "Boundary integral equation methods": *On the fast solution of 3d inverse obstacle scattering.*

32. Workshop on Optimization with Partial Differential Equations: Structure Exploiting Algorithms, Shape Optimization and Automatic Differentiation, Freudenstadt (Germany), 25.–27.6.2007: *Shape optimization for elliptic PDEs.*

33. Workshop "Wavelets and Multiscale Methods", organized by A. Cohen, W. Dahmen, R. DeVore, and A. Kunoth, Oberwolfach (Germany), 29.7.–4.8.2007: *Sparse second moment analysis for elliptic problems on stochastic domains.*

34. Equadiff 2007, Vienna (Austria), 5.–11.8.2007, Mini-Symposium "Fast Boundary Element Methods": *Sparse second moment analysis for potentials on stochastic domains.*

35. ENUMATH 2007, Graz (Austria), 10.–14.9.2007, Mini-Symposium "Fast Methods for Nonlocal Operators": *Sparse second moment analysis for elliptic problems on stochastic domains.*

36. 20th Chemnitz FEM-Symposium, Klaffenbach/Chemnitz (Germany), 24.–26.9. 2007: *Sparse second moment analysis for potentials on stochastic domains.*

37. Chemnitz Symposium on Inverse Problems 2007, Chemnitz (Germany), 27.–28.9. 2007: *Fast methods in 3D inverse obstacle scattering.*

38. Workshop on Nonlinear and Adaptive Approximation in High Dimensions, organized by W. Dahmen, A. Kunoth, R. Schneider and C. Schwab, Physikzentrum Bad Honnef (Germany), 10.–15.12.2007: *Sparse second moment analysis for elliptic PDEs on stochastic domains* (invited talk).

39. Workshop "Efficiency in and Modeling with Computational Stochastic Partial Differential Equations", Hausdorff Research Institute for Mathematics, Bonn (Germany), 3.–5.4.2008: *Sparse second moment analysis for PDEs on stochastic domains.*

40. NASPDE 2008 Workshop (Numerical Analysis of Stochastic Partial Differential Equations), Zurich (Switzerland), 16.–17.5.2008: *A finite element method for elliptic problems with stochastic input data* (invited talk).

41. 4th International Conference on Inverse Problems: Modeling and Simulation, Ölüdeniz-Fethiye (Turkey), 26.–30.5.2008, Mini-Symposium "Recent Progress in Regularization Theory": *Fast methods for 3D electrical impedance tomography.*

42. 21st Chemnitz FEM-Symposium, Chemnitz (Germany), 22.–24.9.2008: *A finite element method for PDEs with stochastic input data.*

43. 6th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 2.–5.10.2008: *Fast methods for 3D electrical impedance tomography.*

44. International Conference on System Theory: Modeling, Analysis and Control, Fes (Marocco), 25.–28.5.2009, Mini-Symposium "Computational Shape Optimization": *Shape optimization for free boundary problems.*

45. ENUMATH 2009, Uppsala (Sweden), 29.6.–3.7.2009, Mini-Symposium "Numerical methods for Stochastic Partial Differential Equations": *A finite element method for PDEs with stochastic input data.*

46. IKM 2009 (International Conference on the Applications of Computer Science and Mathematics in Architecture and Civil Engineering), Weimar (Germany), 7.–9.7.2009, Mini-Symposium "Scientific Computing": *Shape optimization for free boundary problems.*

47. 24th IFIP TC7 Conference on System Modelling and Optimization, Buenos Aires (Argentinia), 27.–31.7.2009, Mini-Symposium "Stability, Sensitivity and Error Analysis for Optimal Control Problems": *Shape optimization for free boundary problems.*

48. Workshop "Nonlinear and Adaptive Approximation", organized by S. Dahlke, A. Kunoth, S. Müller and K. Urban on the occasion of Wolfgang Dahmen's 60th birthday, Günzburg (Germany), 30.9.–3.10.2009: *Wavelet boundary element methods for the polarizable continuum model in quantum chemistry* (invited talk).

49. WONAPDE 2010 (Third Chilean Workshop on Numerical Analysis of Partial Differential Equations), Concepcion (Chile), 11.–15.1.2010, Mini-Symposium "Sparse approximation of high dimensional PDEs": *Finite element based second moment analysis for elliptic problems with stochastic input data.*

50. Workshop "Wavelets and Multiscale Methods", organized by A. Cohen, W. Dahmen, R. DeVore, and A. Kunoth, Oberwolfach (Germany), 1.–7.8.2010: *On error estimation in finite element methods without having Galerkin orthogonality.*

51. NASPDE 2010 Workshop (Numerical Analysis of Stochastic Partial Differential Equations), Freiberg (Germany), 20.–21.9.2010: *The pivoted Cholesky decomposition and its application to stochastic PDEs* (invited talk).

52. Chemnitz Symposium on Inverse Problems 2010, Chemnitz (Germany), 23.–24.9.2010: *An efficient numerical method for a shape identification problem arising from the heat equation.*

53. 23th Chemnitz FEM-Symposium, Lichtenwalde/Chemnitz (Germany), 27.–29.9. 2010: *On error estimation in finite element methods without having Galerkin orthogonality.*

54. IMA Annual Program Year Workshop: Computing with Uncertainty. Mathematical Modeling, Numerical Approximation and Large Scale Optimization of Complex Systems with Uncertainty, Minneapolis (Minnesota, USA), 18.–22.10.2010: *Second moment analysis of elliptic problems with stochastic input parameters* (invited talk).

55. 7th Japanese-German Frontiers of Sciences Symposium, organized by the Alexander von Humboldt Foundation and the Japan Society for the Promotion of Sciences, Potsdam (Germany), 11.–14.11.2010: *Numerical solution of inverse shape identification problems* (invited talk).

56. Mini-Workshop "Nonlinear Least Squares in Shape Identification Problems", organized by M. Dambrine, F. Hettlich, and R. Potthast, Oberwolfach (Germany), 16.–22.1.2011: *Shape optimization for free boundary problems.*

57. SimTech Mini-Workshop "On Minimum Energy Problems", Stuttgart (Germany), 24.1.2011: *Rapid solution of boundary integral equations by wavelet Galerkin schemes.*

58. SIAM CSE 2011 (SIAM Conference on Computational Science and Engineering), Reno (Nevada, USA), 28.2.–4.3.2011, Mini-Symposium "Boundary integral equations for PDE-constrained optimization problems": *Shape optimization for free boundary problems — analysis and numerics.*

59. OCIP 2011 (Workshop on Numerical Methods for Optimal Control and Inverse Problems), Munich (Germany), 14.–16.3.2011: *An efficient numerical method for a shape identification problem arising from the heat equation.*

60. Workshop on Sparse Grids and Applications, organized by M. Griebel and M. Hegland, Bonn (Germany), 16.–20.5.2011: *On the construction of sparse tensor product spaces* (invited talk).

61. Workshop "Advances in Computational Science", Lugano (Switzerland), 30.5.–2.6.2011: *Wavelet boundary element methods for the polarizable continuum model in quantum chemistry* (invited talk).

62. FoCM 2011 (Foundations of Computational Mathematics), Budapest (Ungarn), 4.–14.7.2011, Mini-Symposium "Multiresolution and adaptivity in numerical PDEs": *Sparse tensor finite elements for elliptic multiple scale problems.*

63. Workshop on High-Dimensional Aspects of Stochastic PDEs, organized by C. Schwab, Bonn (Germany), 8.–12.8.2011: *A fast deterministic method for stochastic interface problems* (invited talk).

64. 4th German-Chinese Workshop on Computational and Applied Mathematics, Guangzhou (China), 26.–30.9.2011: *Second moment analysis of elliptic problems with uncertain input parameters* (invited talk).

65. ESCO 2012 (European Seminar on Computing), Pilsen (Tschechien), 25.–29.6. 2012, Mini-Symposium "Uncertainty Quantification for PDE": *A fast deterministic method for stochastic interface problems.*

66. 2nd Workshop on Sparse Grids and Applications, Munich (Germany), 2.–6.6.2012: *Approximation of two-variate functions: singular value decomposition vs. sparse grids* (invited talk).

67. SimTech Mini-Workshop "On Minimum Energy Problems", Stuttgart (Germany), 17.–18.8.2012: *Analytical and numerical methods in shape optimization.*

68. 25th Chemnitz FEM-Symposium 2012, Chemnitz (Germany), 24.–26.9.2012: *Combination technique based k-th moment analysis of elliptic problems with random diffusion.*

69. 10th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 27.–30.9.2012: *Wavelet boundary element methods for the polarizable continuum model in quantum chemistry.*

70. ESI 2012 Modern Methods of Time-Frequency Analysis II, Workshop 4: Wavelet methods in scientific computing, Vienna (Austria), 12.–16.11.2012: *On the construction of sparse tensor product spaces* (invited talk).

71. IABEM 2013 (Symposium of the International Association for Boundary Element Methods), Santiago de Chile (Chile), 9.–11.1.2013: *Comparison of fast boundary element methods on parametric surfaces.*

72. WONAPDE 2013 (Fourth Chilean Workshop on Numerical Analysis of Partial Differential Equations), Concepcion (Chile), 14.–18.1.2013, Mini-Symposium "Efficient approximation methods for high-dimensional problems": *On multilevel quadrature for elliptic stochastic partial differential equations.*

73. Workshop "Numerical Methods for PDE Constrained Optimization with Uncertain Data", organized by M. Heinkenschloss and V. Schulz, Oberwolfach (Germany), 28.1.–1.2.2013: *Modelling and simulation of elliptic PDEs on random domains.*

74. Workshop "Numerical Methods for Uncertainty Quantification", organized by A. Chernov, V. Heuveline and F. Nobile, Hausdorff Center for Mathematics, Bonn (Germany), 13.–17.5.2013: *On multilevel quadrature for elliptic stochastic partial differential equations* (invited talk).

75. EUCCO 2013 (3rd European Conference on Computational Optimization), Chemnitz (Germany), 17.–19.7.2013, Mini-Symposium "Discretization of optimal control problems": *On shape optimization with parabolic state equation.*

76. Workshop "Multiscale and High-Dimensional Problems", organized by A. Cohen, W. Dahmen, R. DeVore, and A. Kunoth, Oberwolfach (Germany), 28.7.–3.8.2013: *Multilevel quadrature for elliptic stochastic partial differential equations.*

77. ENUMATH 2013, Lausanne (Switzerland), 26.–30.8.2013, Mini-Symposium "Uncertainty Quantification for PDE models": *Multilevel quadrature for elliptic stochastic partial differential equations.*

78. 22nd International Conference on Domain Decomposition Methods (DD22), Lugano (Switzerland), 16.–20.9.2013, Mini-Symposium "Solvers for isogeometric analysis and applications": *BPX-preconditioning for isogeometric analysis.*

79. Workshop "Discrepancy, Numerical Integration and Hyperbolic Cross Approximation", organized by T. Ullrich and V. Temlyakov, Hausdorff Center for Mathematics, Bonn (Germany), 23.–27.9.2013: *Multilevel quadrature for elliptic stochastic partial differential equations* (invited talk).

80. 11th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 26.–29.9.2013: *On shape optimization with parabolic state equation.*

81. Valparaiso Numerico IV, Septimo Encuentro de Analisis Numerico de Ecuaciones Diferenciales Parciales, Valparaiso (Chile), 11.–13.12.2013: *Analytical and numerical methods in shape optimization* (invited talk).

82. ESI-Workshop on Time-Frequency Analysis, Vienna (Austria), 13.–17.1.2014: *Adaptive wavelet boundary element methods* (invited talk).

83. Mini-Symposium "Numerical Methods in Quantum Chemistry", Tromsø (Norwegen), 19.3.2014: *Wavelet boundary element methods for the polarizable continuum model* (invited talk).

84. SIAM UQ 2014 (SIAM Conference on Uncertainty Quantification), Savannah (Georgia, USA), 31.3.–3.4.2014, Mini-Symposium "Numerical approximation of high-dimensional stochastic equations": *Multilevel quadrature for elliptic stochastic partial differential equations.*

85. International Symposium on Applied Analysis in Honour of the 65th Birthday of Michel Chipot and His Retirement, Zurich (Switzerland), 10.–11.6.2014: *Shape optimization for free boundary problems.*

86. ICOSAHOM 2014 (International Conference on Spectral and High Order Methods), Salt Lake City (Utah, USA), 23.–27.6.2014, Mini-Symposium "High order methods for high-dimensional problems: Applications in UQ": *$\mathcal{H}$-matrix accelerated second moment analysis for potentials with rough correlation.*

87. Mid-term workshop of the BIOTOP project, Traunkirchen (Austria), 19.–21.8. 2014: *The $\mathcal{H}^2$-wavelet method.*

88. NASPDE 2014 Workshop (Numerical Analysis of Stochastic Partial Differential Equations), Lausanne (Switzerland), 9.–10.9.2014: *Numerical solution of elliptic diffusion problems on random domains* (invited talk).

89. 12th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 25.–28.9.2014: *The $\mathcal{H}^2$-wavelet method.*

90. Workshop "Shape and Topological Optimization", organized by É. Oudet and M. Rumpf, RICAM, Linz (Austria), 13.–17.10.2014: *On parametric shape optimization* (invited talk).

91. FoCM 2014 (Foundations of Computational Mathematics), Montevideo (Uruguay), 11.–20.12.2014, Mini-Symposium "Multiresolution and adaptivity in numerical PDEs": *Adaptive wavelet boundary element methods.*

92. Workshop "New Discretization Methods for the Numerical Approximation of PDEs", organized by S. Dahlke, G. Kutyniok, R. Stevenson, and E. Süli, Oberwolfach (Germany), 11.–17.1.2015: *Sparse BEM for the heat equation.*

93. 86. GAMM Jahrestagung, Lecce (Italy), 23.–27.3.2015, Section "Optimization of differential equations": *A second order convergent trial method for free boundary problems in three dimensions.*

94. Workshop "Advances in Numerical Methods for SPDEs", organized by D. Cohen, A. Lang, and S. Larsson, Mittag-Leffler-Institut, Djursholm (Sweden), 16.–18.6. 2015: *Numerical solution of elliptic diffusion problems on random domains* (invited talk).

95. Workshop on Generalised Convexity and Set Computation, organized by M. Rasmussen, J. Rieger, and K. Webster, Imperial College London (England), 3.–5.8. 2015: *Analytical and numerical methods in shape optimization* (invited talk).

96. 2nd Chongqing Workshop on Computational and Applied Mathematics, in honor of Prof. George C. Hsiao, Prof. Jean-Claude Nédélec and Prof. Wolfgang L. Wendland, Chongqing (China), 16.–19.8.2015: *Adaptive wavelet boundary element methods* (invited talk).

97. 5th German-Chinese Workshop on Computational and Applied Mathematics, Augsburg (Germany), 20.–25.9.2015: *Numerical solution of elliptic diffusion problems on random domains* (invited talk).

98. 13th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 23.–26.10.2015: *Efficient approximation of random fields for numerical applications.*

99. Direct and Inverse Problems for PDEs with Random Coefficients, Weierstraß-Institut für Angewandte Analysis und Stochastik, Berlin (Germany), 9.–13.11. 2015: *Multilevel accelerated quadrature for PDEs with random diffusion* (invited talk).

100. Exploiting New Advances in Mathematics to Improve Calculations in Quantum Molecular Dynamics, Banff (Canada), 24.–29.1.2016: *Wavelet boundary element methods for the polarizable continuum model* (invited talk).

101. Mini-Workshop "Mathematical Foundations of Isogeometric Analysis", organized by T. Hughes, B. Jüttler, A. Kunoth, and B. Simeon, Oberwolfach (Germany), 7.–13.2.2016: *On fast boundary element methods for parametric surfaces.*

102. SIAM UQ 2016 (SIAM Conference on Uncertainty Quantification), Lausanne (Switzerland), 5.–8.4.2016, Mini-Symposium "PDE Constrained Optimization with Uncertain Data": *Shape optimization for quadratic functionals and states with random right-hand sides.*

103. Workshop "Uncertainty Quantification", organized by D. Estap, M. Gunzburger, A. Kunoth, M.G. Larson, and S. Larsson, Mittag-Leffler-Institut, Djursholm (Sweden), 9.–13.5.2016: *Multilevel accelerated quadrature for PDEs with random diffusion* (invited talk).

104. PICOF 2016 (Problèmes Inverses, Contrôle et Optimisation de Formes), Autrans (France), 1.–3.6.2016, Mini-Symposium "Shape optimization under uncertainties": *Shape optimization for quadratic functionals and states with random right-hand sides.*

105. ECCOMAS 2016 (European Conference on Computational Methods in Applied Sciences and Engeneering), Heraklion (Crete), 5.–10.6.2016, Mini-Symposium "Isogeometric Methods": *An interpolation-based fast multipole method for higher order boundary elements on parametric surfaces.*

106. ECMI 2016 (European Conference on Mathematics for Industry), Santiago de Compostela (Spain), 13.–17.6.2016, Mini-Symposium "Stochastic PDEs and uncertainty quantification with applications in engineering": *Shape optimization for quadratic functionals and states with random right-hand sides.*

107. Fourteenth International Conference Zaragoza-Pau on Mathematics and its Applications, Jaca (Spain), 12.–15.9.2016, Mini-Symposium "Geometric uncertainties": *Shape optimization for quadratic functionals and states with random right-hand sides.*

108. Uncertainty Quantification and High Performance Computing, Schloss Dagstuhl (Germany), 11.–16.9.2016: *Solution of free boundary problems in the presence of geometric uncertainties.*

109. 29th Chemnitz FEM-Symposium 2016, Chemnitz (Germany), 26.–28.9.2016: *Numerical solution on boundary value problems on domains with a thin layer of random thickness.*

110. 14th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 13.–16.10.2016: *A fast sparse grid based space-time boundary element method for the nonstationary heat equation.*

111. Mini-Workshop "Adaptive methods for control problems constrained by time-dependent PDEs", organized by M. Gunzburger, K. Kunisch, and A. Kunoth,

Oberwolfach (Germany), 8.–14.1.2017: *On shape optimization with parabolic state equation.*

112. 7th Workshop on High-Dimensional Approximation, organized by J. Dick, F. Kuo and D. Nuyens, Sydney (Australia), 13.–17.2.2017: *Novel results for the anisotropic sparse grid quadrature.*

113. Workshop "Multiscale and High-Dimensional Problems", organized by A. Cohen, W. Dahmen, R. DeVore, and A. Kunoth, Oberwolfach (Germany), 26.3.–1.4.2017: *Novel results for the anisotropic sparse grid quadrature.*

114. Conference "Wavelet and Tensor Methods for Partial Differential Equations" in Honor of Reinhold Schneider on the Occasion of his 60th Birthday, Berlin (Germany), 3.–5.5.2017: *Wavelets meet boundary integral equations.*

115. UNCECOMP 2017 (2nd International Conference on Uncertainty Quantification in Computational Sciences and Engineering), Rhodes Island (Greece), 15.–17.6.2017, Mini-Symposium: "Uncertainty computations with reduced order models and low-rank representations": *Numerical solution on boundary value problems on domains with a thin layer of random thickness.*

116. 30th Chemnitz FEM-Symposium 2017, Strobl (Austria), 25.–27.9.2017: *Adaptive wavelet boundary element methods.*

117. 18th French-German-Italian Conference on Optimization, Paderborn (Germany), 25.–28.9.2017: *Shape optimization for free boundary problems. Analysis and numerics* (invited talk).

118. 3rd GAMM AGUQ Workshop on Uncertainty Quantification, Dortmund (Germany), 12.–14.3.2018: *Shape optimization for quadratic functionals and states with random right-hand sides* (invited talk).

119. Strobl 18: Harmonic Analysis and Applications, Strobl (Austria), 4.–8.6.2018: *Wavelets meet boundary integral equations* (invited talk).

120. ESI 2018 Numerical Analysis of Complex PDE Models in the Sciences, Workshop 1: Interplay of Tensor Structured Formats with Advanced PDE Discretizations; Session on Signal Processing Techniques and Directionally Adapted Discretizations, Vienna (Austria), 11.–15.6.2018: *Second moment analysis for partial differential equations with random input parameters* (invited talk).

121. IABEM 2018 (Symposium of the International Association for Boundary Element Methods), Paris (France), 26.–28.6.2018: *Adaptive wavelet boundary element methods.*

122. 14th Viennese Conference on Optimal Control and Dynamic Games (ORCOS), Vienna (Austria), 3.–6.7.2018, Mini-Symposium: "Numerical analysis for PDE constrained optimization": *Optimization of current carrying multicables.*

123. NUMACH 2018: Numerical Methods for Challenging Problems, Mulhouse (France), 16.–18.7.2018: *Shape optimization for quadratic functionals and states with random right-hand sides* (invited talk).

124. 28th IFIP TC7 Conference on System Modelling and Optimization, Essen (Germany), 23.–27.7.2018: *Analytical and numerical methods in shape optimization* (invited talk).

125. Workshop "New Directions in Stochastic Optimisation", organized by J. De Loera, D. Dentcheva, G. Pflug, and R. Schultz, Oberwolfach (Germany), 19.–25.8.2018: *Shape optimization under uncertainty.*

126. 16th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 4.–7.10.2018: *Multilevel quadrature for elliptic problems on random domains by the coupling of FEM and BEM.*

127. Workshop "Frontier Technologies for High-Dimensional Problems and Uncertainty Quantification", organized by F. Kuo, D. Nuyens, and R. Scheichl, RICAM, Linz (Austria), 17.–21.12.2018: *Convergence estimates for tensor approximation schemes* (invited talk).

128. WONAPDE 2019 (Sixth Chilean Workshop on Numerical Analysis of Partial Differential Equations), Concepcion (Chile), 21.–25.1.2019: *Wavelets meet boundary integral equations* (invited talk).

129. Swiss Numerics Day 2019, Lugano (Switzerland), 11.5.2019: *Analytical and numerical methods in shape optimization* (invited talk).

130. Mini-Workshop "Mathematical Foundations of Isogeometric Analysis", organized by A. Buffa, T. Hughes, A. Kunoth, and C. Manni, Oberwolfach (Deutschland), 14.–20.7.2019: *About a fast isogeometric boundary element method.*

131. WAVES 2019 (14th International Conference on Mathematical and Numerical Aspects of Wave Propagation), Vienna (Austria), 25.–30.8 2019, Mini-Symposium: "Frames and PDEs": *Multilevel frames for solving high-dimensional partial differential equations.*

132. Workshop "Innovative Approaches to the Numerical Approximation of PDEs", organized by S. Dahlke, G. Kutyniok, R. Nochetto, and R. Stevenson, Oberwolfach (Germany), 1.–7.9.2019: *Analysis of tensor approximation schemes for continuous functions.*

133. RMMM 2019 (Reliable Methods of Mathematical Modeling), Vienna (Austria), 9.–13.9 2019: *Modelling and simulation of partial differential equations on random domains* (invited talk).

134. DEA 2019 (Dynamics, Equations and Applications), Krakov (Poland), 16.–20.9. 2019, Mini-Symposium "Efficient approximation of high-dimensional problems": *Analysis of tensor approximation schemes for continuous functions.*

135. Workshop "Optimization and Inversion under Uncertainty", organized by M. Heinkenschloss and G. Stadler, RICAM, Linz (Austria), 11.–15.11.2019: *Shape optimization under uncertainty* (invited talk).

136. Workshop "Uncertainty Quantification", organized by S. Roberts et al., Canberra (Australia), 25.–29.11.2019: *Modelling and simulation of partial differential equations on random domains* (invited talk).

137. Workshop "Boundary Element Methods", organized by S. Chaillat-Loseille, R. Hiptmair, F.-J. Sayas, and O. Steinbach, Oberwolfach (Deutschland), 2.–8.2.2020: *A wavelet-based approach for the optimal control of nonlocal operator equations.*

138. 18th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 8.–11.10.2020: *A wavelet-based approach for the optimal control of nonlocal operator equations.*

139. Workshop "Computation and Learning in High Dimensions", organized by A. Cohen, W. Dahmen, R. DeVore, and A. Kunoth, Oberwolfach (Germany), 1.–7.8.2021: *Multilevel approximation of Gaussian random fields.*

140. 34th Chemnitz FEM-Symposium 2021, Chemnitz (Germany), 6.–8.9.2021: *Shape optimization for composite materials and scaffold structures.*

141. 15th International Conference on Free Boundary Problems: Theory and Applications, Berlin (Germany), 13.–17.9.2021, Mini-Symposium: "UQ in free boundary problems": *Solving a Bernoulli type free boundary problem with random diffusion.*

142. 19th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 17.–20.10.2021: *Isogeometric multilevel quadrature for forward and inverse random acoustic scattering.*

143. SIAM UQ 2022 (SIAM Conference on Uncertainty Quantification), Atlanta (USA), 12.–15.4.2022, Mini-Symposium "IGA and Other Spline-Based Methods in UQ": *Isogeometric multilevel quadrature for forward and inverse random acoustic scattering.*

144. ESI 2022 Computational Uncertainty Quantification: Mathematical Foundations, Methodology & Data, Workshop 2: Computational Uncertainty Quantification, Vienna (Austria), 9.–13.05.2022: *Efficient numerical algorithms for shape uncertainty quantification* (invited talk).

145. Conference on shape optimization, related topics and applications, Roscoff (France), 13.–17.6.2022: *Shape optimization for time-dependent domains* (invited talk).

146. International Multigrid Conference (IMG 2022), Lugano (Switzerland), 22.–26.8.2022, Mini-Symposium "Multilevel and multiresolution methods in uncertainty quantification": *Isogeometric multilevel quadrature for forward and inverse random acoustic scattering.*

147. CMAM 2022 (9th International Conference on Computational Methods in Applied Mathematics), Vienna (Austria), 29.8.–2.9.2022, Mini-Symposium "Computational stochastic PDEs": *Isogeometric multilevel quadrature for forward and inverse random acoustic scattering.*

148. 35th Chemnitz FEM-Symposium 2021, Herrsching (Germany), 15.–17.9.2022: *Shape optimization for time-dependent domains.*

149. 20th Workshop on fast boundary element methods in industrial applications, Hirschegg (Austria), 13.–16.10.2022: *Boundary integral equations for the heat equation in time-dependent domains.*

150. IGA 2022 (10th International Conference on Isogeometric Analysis), Banff (Canada), 6.–9.11.2022, Mini-Symposium "Mathematical foundation of IGA": *Domain variations in IGA for UQ and optimization.*

151. 9th Workshop on High-Dimensional Approximation, organized by J. Nichols, A. Gilbert, T. Cui and M. Hegland, Canberra (Australien), 20.–24.2.2023: *Low-rank tensor approximation of continuous functions.*

152. SIAM CSE 2023 (SIAM Conference on Computational Science and Engineering), Amsterdam (Netherlands), 27.2.–3.3.2023, Mini-Symposium "New developments in shape, topology and tubular optimization": *Shape optimization for parabolic problems on time-dependent domains.*

153. Workshop: Optimization Problems for PDEs in Weak Space-Time Form, organized by H. Harbrecht, A. Kunoth, V. Simoncini, and K. Urban, Oberwolfach (Germany), 5.–11.3.2023: *Shape optimization for parabolic problems on time-dependent domains.*

154. ICOSAHOM 2023 (International Conference on Spectral and High Order Methods), Seoul (Republic of Korea), 14.–18.8.2023, Mini-Symposium "Tensor networks and compositional functions for high-dimensional approximation": *Low-rank tensor approximation of continuous functions.*

155. ICIAM 2023 (International Conference on Industrial and Applied Mathematics), Tokyo (Japan), 20.–25.8.2023, Mini-Symposium "Hierarchical low rank tensors and DNNs for high-dimensional approximation": *Low-rank tensor approximation of continuous functions.*

156. Deep Learning – High Dimensions, and Everything In Between, Workshop in honour of Christoph Schwab's 60th birthday, Zurich (Switzerland), 25.–26.8.2023: *Samplet based kernel matrix compression* (invited talk).

157. ENUMATH 2023, Lisbon (Portugal), 4.–8.9.2023, Mini-Symposium "Space-time methods for evolutionary PDEs": *Shape optimization for parabolic problems on time-dependent domains.*

158. 36th Chemnitz FEM-Symposium 2023, Leibnitz (Austria), 11.–13.9.2023: *Isogeometric multilevel quadrature for forward and inverse random acoustic scattering.*

2.2 Invited Presentations at Institutes and Colloquia

1. Departamento de Ingenieria Matematica, Universidad de Concepcion, Concepcion (Chile), 25.8.1999: *Wavelet based fast solution of BEM.*

2. Weierstraß-Institut für Angewandte Analysis und Stochastik, Berlin (Germany), 12.11.2002: *Numerical solution of elliptic shape optimization problems using wavelet-based BEM.*

3. Oberseminar "Analysis und numerische Methoden für partielle Differentialgleichungen der Strömungs- und Festkörpermechanik", Fachbereich Mathematik, Universität Stuttgart, Stuttgart (Germany), 21.11.2002: *Shape optimization using wavelet BEM.*

4. SAM Kolloquium, ETH Zürich, Zurich (Switzerland), 15.1.2003: *Wavelet based fast solution of BEM.*

5. Seminar der Arbeitsgruppe Angewandte Analysis und Numerische Mathematik, Friedrich-Alexander-Universtät Erlangen-Nürnberg, Erlangen (Germany), 23.1. 2003: *Wavelet based fast solution of BEM.*

6. Kolloquium über Angewandte Mathematik, Institut für Numerische und Angewandte Mathematik, Georg-August-Universität Göttingen, Göttingen (Germany), 6.1.2004: *Shape optimization using wavelet BEM.*

7. Colloquium of the Scientific Computing Group an der TU Eindhoven, Eindhoven (Netherlands), 20.10.2004: *Wavelet based fast solution of BEM.*

8. Seminar of the DFG-Sonderforschungsbereich 393 "Parallele Numerische Simulation für Physik und Kontinuumsmechanik", TU Chemnitz, Chemnitz (Germany), 20.5.2005: *Shape optimization using wavelet BEM.*

9. Oberseminar Numerik, Abteilung Numerik at the Universität Ulm, Ulm, (Germany), 20.10.2005: *Efficient methods in shape optimization.*

10. SAM Kolloquium, ETH Zürich, Zurich (Switzerland), 16.11.2005: *Adaptive wavelet boundary element methods.*

11. Forschungsseminar "Partielle Differentialgleichungen und Inverse Probleme", TU Chemnitz, Chemnitz (Germany), 16.12.2005: *Ill-posed problems in shape optimization.*

12. Seminar des Instituts für Numerische Mathematik, TU Dresden, Dresden (Germany), 23.5.2006: *Wavelet based fast solution of BEM.*

13. Graduate-Seminar "Identifikation in mathematischen Modellen – Synergie stochastischer und numerischer Methoden", Institut für Numerische und Angewandte Mathematik, Georg-August-Universität Göttingen, Göttingen (Germany), 1.6.2006: *Wave-let Galerkin schemes for boundary integral equations.*

14. Seminar, Fachbereich für Mathematik, Universität Stuttgart, Stuttgart (Germany), 4.5.2007: *Analytische und numerische Methoden in der Formoptimierung.*

15. Seminar, Fakultät für Mathematik, Universität Duisburg-Essen, Duisburg (Germany), 10.5.2007: *Analytische und numerische Methoden in der Formoptimierung.*

16. Seminar, Fakultät für Mathematik, TU Chemnitz, Chemnitz (Germany), 24.5. 2007: *Analytische und numerische Methoden in der Formoptimierung.*

17. Mathematisches Kolloquium, Institut für Mathematik an der Johannes-Gutenberg-Universität Mainz, Mainz (Germany), 14.6.2007: *Analytische und numerische Methoden in der Formoptimierung.*

18. SAM Kolloquium, ETH Zürich, Zurich (Switzerland), 3.10.2007: *Shape optimization for elliptic PDEs.*

19. Colloquium, Zentrum Mathematik, Technische Universität München, Munich (Germany), 23.10.2007: *Analytische und numerische Methoden in der Formoptimierung.*

20. Colloquium, Institut für Wissenschaftliches Rechnen und Mathematische Modellbildung, Universität Karlsruhe (TH), Karlsruhe (Germany), 30.11.2007: *Shape optimization for elliptic PDEs.*

21. Seminar, Fachbereich für Mathematik und Statistik, Universität Konstanz, Konstanz (Germany), 11.12.2007: *Analytische und numerische Methoden in der Formoptimierung.*

22. Seminar, Institut für Mathematik, Freie Universität Berlin, Berlin (Germany), 30.4.2008: *Gebietsvariationen in Optimierung und Ergebnisverifikation.*

23. Seminar, Fachbereich für Mathematik, Universität Stuttgart, Stuttgart (Germany), 19.6.2008: *Gebietsvariationen in Optimierung und Ergebnisverifikation.*

24. Seminar, Institut für Mathematik der Universität Oldenburg, Oldenburg (Germany), 25.8.2008: *Gebietsvariationen in Optimierung und Ergebnisverifikation.*

25. Seminar, Centre for Theoretical and Computational Chemistry, Department of Chemistry, University of Tromsø, Tromsø (Norwegen), 26.9.2008: *Wavelet Galerkin Schemes for Boundary Integral Equations.*

26. Applied Mathematics Research Seminar, Department of Mathematical Sciences, Brunel University, West London (England), 17.11.2008: *A finite element method for PDEs with stochastic input data.*

27. Seminar, Fachbereich für Mathematik, Universität Kaiserslautern, Kaiserslautern (Germany), 5.2.2009: *Gebietsvariationen in Optimierung und Ergebnisverifikation.*

28. Seminar, Groupe de travail "Méthodes Numériques" du Laboratoire Jacques-Louis Lions, Paris (France), 16.2.2009: *A finite element method for PDEs with stochastic input data.*

29. Seminar, Fakultät für Mathematik und Geoinformation, TU Vienna, Vienna (Austria), 14.5.2009: *Gebietsvariationen in Optimierung und Ergebnisverifikation.*

30. Seminar, Institute for Computational Science, Universität Lugano, Lugano (Switzerland), 15.5.2009: *Shape variations in optimization and verification.*

31. SAM Kolloquium, ETH Zürich, Zurich (Switzerland), 7.10.2009: *On error estimation in finite element methods without having Galerkin orthogonality.*

32. Seminar, Department für Mathematik, Universität Basel, Basel (Switzerland), 19.11. 2009: *Analytical and numerical methods in shape optimization.*

33. Mathematisches Kolloquium, Institut für Mathematik, Universität Paderborn, Paderborn (Germany), 5.1.2010: *Analytische und numerische Methoden in der Formoptimierung.*

34. Seminar, Institut für Mathematik und Bauinformatik, Universität der Bundeswehr München, Neubiberg (Germany), 1.3.2010: *Analytische und numerische Methoden in der Formoptimierung.*

35. Seminar, Fachbereich Mathematik, Universität Bonn, Bonn (Germany), 3.12. 2010: *Numerische Lösung von partiellen Differentialgleichungen mit stochastischen Eingangsparametern.*

36. Seminar, Fachbereich für Mathematik und Statistik, Universität Konstanz, Konstanz (Germany), 8.12.2011: *Gebietsvariationen in Optimierung und Ergebnisverifikation.*

37. Seminar über Partielle Differentialgleichungen und Numerik, Universität Zürich, Zurich (Switzerland), 29.3.2012: *Analytical and numerical methods in shape optimization.*

38. Seminar of Numerical Analysis, MATHICSE, EPF Lausanne, Lausanne (Switzerland), 23.5.2012: *Shape variations in optimization and verification.*

39. Séminaire d'analyse numérique, Section de Mathématiques, Université de Genève (Switzerland), 4.12.2012: *Analytical and numerical methods in shape optimization.*

40. SAM Kolloquium, ETH Zürich, Zurich (Switzerland), 24.4.2013: *Modelling and simulation of elliptic PDEs on random domains.*

41. Oberseminar "Angewandte Mathematik" (Eucor-Seminar), Universität Freiburg, Freiburg (Germany), 18.6.2013: *Analytical and numerical methods in shape optimization.*

42. Mathematisches Kolloquium, Institut für Mathematik, Universität Paderborn, Paderborn (Germany), 24.6.2013: *Modelling and simulation of elliptic PDEs on random domains.*

43. Lothar-Collatz-Kolloquium für Angewandte Mathematik, Universität Hamburg, Hamburg (Germany), 30.10.2014: *Numerical solution of elliptic diffusion problems on random domains.*

44. Karlsruher PDE-Seminar, Schwerpunkt Partielle Differentialgleichungen, Karlsruhe Institute of Technology, Karlsruhe (Germany), 20.11.2014: *Improved trial methods for a class of generalized Bernoulli problems.*

45. Computational and Applied Mathematics Seminar, Department of Mathematics, Brunel University, West London (England), 26.2.2015: *Adaptive wavelet boundary element methods.*

46. Applied Mathematics Seminar, Department of Mathematics, University College London, London (England), 12.5.2015: *Wavelet Galerkin schemes for boundary integral equations.*

47. Kolloquium über Angewandte Mathematik, Institut für Numerische und Angewandte Mathematik, Georg-August-Universität Göttingen, Göttingen (Germany), 19.5.2015: *Numerical solution of elliptic diffusion problems on random domains.*

48. CRC 1060 Seminar, Universität Bonn, Bonn (Germany), 9.6.2015: *Numerical solution of elliptic diffusion problems on random domains.*

49. Mathematical Colloquium, Departement Mathematik und Statistik, Universität Bern, Bern (Switzerland), 19.10.2015: *Analytical and numerical methods in shape optimization.*

50. Department of Mathematics, RWTH Aachen University, Aachen (Germany), 18.4.2016: *Computational methods for partial differential parameters with random input parameters.*

51. Faculty of Mathematics and Informatics, Heidelberg University, Heidelberg (Germany), 1.7.2016: *Computational methods for partial differential parameters with random input parameters.*

52. Seminar of the Chair of Theoretical Chemistry, Technische Universität München, Munich (Germany), 5.7.2016: *Wavelet boundary element methods for the polarizable continuum model.*

53. CRC 1114 Colloquium, Freie Universität Berlin, Berlin (Germany), 5.1.2017: *Modelling and simulation of elliptic diffusion problems on random domains.*

54. Séminaire d'analyse, Laboratoire de mathématiques, informatique et applications, Université Haute-Alsace, Mulhouse (France), 16.3.2017: *Numerical solution of elliptic diffusion problems on random domains.*

55. IANS Highlight Seminar, Universität Stuttgart, Stuttgart (Germany), 11.5.2017: *Modelling and simulation of elliptic diffusion problems on random domains.*

56. Colloquium of the Department of Computer Science, Christian-Albrechts-University of Kiel, Kiel (Germany), 2.6.2017: *Multilevel accelerated quadrature for PDEs with random diffusion.*

57. Kolloquium des Fachbereichs Mathematik, Technical University of Darmstadt, Darmstadt (Germany), 5.7.2017: *Fast boundary element methods for parametric surfaces.*

58. Colloquium of the Acoustics Research Institute, Austrian Academy of Sciences, Vienna (Austria), 16.9.2017: *Wavelets meet boundary integral equations.*

59. Oberseminar zur Numerik und Optimierung, Fachbereich Mathematik/Informatik, Philipps-Universität Marburg, Marburg (Germany), 11.12.2017: *Wavelets meet boundary integral equations.*

60. Seminar in Mathematics, University of Pau (France), 6.6.2019: *Modelling and simulation of elliptic diffusion problems on random domains.*

61. Kolloquium der Arbeitsgruppe Modellierung – Numerik – Differentialgleichungen, Institut für Mathematik, TU Berlin, Berlin (Germany), 9.7.2019: *Analytical and numerical methods in shape optimization.*

62. Kolloquium, Department of Mathematics, Universität Fribourg (Switzerland), 5.11.2019: *Analytical and numerical methods in shape optimization.*

63. Zurich Colloquium in Applied and Computational Mathematics, Zurich (Switzerland), 9.12.2020: *A fast isogeometric boundary element method.*

64. MATH4UQ Research Seminar, RWTH Aachen, Aachen (Germany), 13.7.2021: *Multilevel approximation of Gaussian random fields.*

65. Math Jour Fixe of the Acoustics Research Institute, Austrian Academy of Sciences, Vienna (Austria) 18.1.2022: *Multilevel approximation of Gaussian random fields.*

66. Research Seminar of the Group Numerische Mathematik deterministischer und stochastischer partieller Differentialgleichungen, FU Berlin, Berlin (Germany), 11.1.2023: *Shape optimization for time-dependent domains.*

67. Computational Mathematics Seminar, EPF Lausanne, Lausanne (Switzerland), 9.2.2023: *Low-rank approximation of continuous functions.*

68. MSI Colloquium, Australien National University, Canberra (Australia), 23.2.2023: *Analytical and numerical methods in shape optimization.*

69. Informatik-Kolloquium, University of Bonn, Bonn (Germany), 8.5.2023: *Computational mathematics in applications.*

70. Kolloquium, Universität Bayreuth, Bayreuth (Germany), 13.6.2023: *Samplet based kernel matrix compression.*

71. Weierstraß-Institut für Angewandte Analysis und Stochastik, Berlin (Germany), 18.7.2023: *Low-rank tensor approximation of continuous functions.*

3 Guest Stays at Other Universities

3.1 Research Stays Abroad (> 1 Week)

1. Research stay (Juli+August 1999) at the Departamento Ingenieria Matematica (G.N. Gattica/F. Paiva) of the Universidad de Concepcion, Concepcion (Chile).

2. PostDoc (May 2004–März 2005) at the Department of Mathematics (R. Stevenson) of the Universiteit Utrecht, Utrecht (Netherlands).

3. Research stay 12.–21.8.2009 at the Center of Theoretical and Computational Chemistry (L. Frediani), Universitetet i Tromsø, Tromsø (Norway).

4. Research stay 26.7.–5.8.2011 at the Department of Mathematics (J. Tausch), Southern Methodist University, Dallas (Texas, USA).

5. Research stay 4.–22.6.2012 at the Institut für Numerische Simulation (M. Griebel), Universität Bonn, Bonn (Germany).

6. Research stay 2.3.–2.4.2015 at the Fachbereich Mathematik (D. Kressner und F. Nobile), EPF Lausanne, Lausanne (Switzerland).

7. Research stay 1.–12.6.2015 at the Institut für Numerische Simulation (M. Griebel), Universität Bonn, Bonn (Germany).

8. Research stay 21.6.–1.7.2015 at the Department of Mathematics (J. Tausch), Southern Methodist University, Dallas (Texas, USA).

9. Research stay 3.–14.9.2018 at the Institut für Numerische Simulation (M. Griebel), Universität Bonn, Bonn (Germany).

10. Research stay 3.–14.9.2018 at the Institut für Numerische Simulation (M. Griebel), Universität Bonn, Bonn (Germany).

11. Research stay 7.–17.9.2020 at the Institut für Numerische Simulation (M. Griebel), Universität Bonn, Bonn (Germany).

12. Research stay 24.8.–3.9.2021 at the Euler-Institut (M. Multerer), USI Lugano, Lugano (Switzerland).

13. Research stay 28.9.–8.10.2021 at the Institut für Numerische Simulation (M. Griebel), Universität Bonn, Bonn (Germany).

14. Research stay 27.6.–7.7.2023 at the Institut für Numerische Simulation (M. Griebel), Universität Bonn, Bonn (Germany).

3.2 Short-Term Lectureships

1. October 2005–January 2006: Lectureship at the Seminar for Applied Mathematics of the ETH Zurich, Zurich (Switzerland).

2. October 2006–March 2007: Lectureship at the Institute for Applied Mathematics of the Bonn University (Germany).

3.3 Replacement Professorships

1. 1.4.2006–30.9.2006: Replacement of the professorship *Mathematische Methoden der Physik* (F. Otto) at the Institute for Applied Mathematics of the Bonn University (Germany).