

CURRICULUM VITAE

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Personal Information

Date of Birth	12-4-59
Place of Birth	Bremen
Citizenship	German
Marital Status	Married, one Child

Education

1979-1981	Study of Physics at the University of Bremen
1981-1983	Study of Physics at University of Göttingen
1983-1985	Study of Physics at the University of Bremen
1985	Degree in Physics, University of Bremen
1989	Ph.D. in Mathematics, University of Bremen

Academic Career

1989-1992	Assistent Professor, Free University of Berlin
1992-1994	Assistent Professor, RWTH Aachen
1994-1995	Visiting Assistent Professor, Department of Mathematics, University of South Carolina
1995-1996	Assistent Professor, RWTH Aachen
1996	Habilitation, Department of Mathematics, RWTH Aachen
WS 96/97-SS 97	Associate Professor, RWTH Aachen
Dez. 97	Visiting Professor, TU Chemnitz
1998 - 2001	Research Grant from the German National Science

	Foundation, RWTH Aachen
SS 2000	Associate Professor, University of Gießen
2001 – 2002	Senior Lecturer, Leader of the Research Group “Wavelet Analysis and Approximation Theory”, ZeTeM, , University of Bremen
since April 2002	Full Professor, Philipps–University of Marburg

Publications

Theses:

1. S. Dahlke, Invariante Mannigfaltigkeiten für Produkte zufälliger Diffeomorphismen, Dissertation, refereed by Prof. Dr. L. Arnold and Prof. Dr. H. F. Münzner, University of Bremen 1989, 1–106.
2. S. Dahlke, Wavelets: Construction Principles and Applications to the Numerical Treatment of Operator Equations, Habilitation thesis, RWTH Aachen, refereed by Prof. Dr. W. Dahmen (Aachen), Prof. Dr. R. DeVore (Columbia, South Carolina) and Prof. Dr. H. Esser (Aachen), Shaker Verlag, Aachen, 1997, ISBN 3-8265-2549-3, 1–181.

Publications in Journals:

1. S. Dahlke and I. Weinreich, Wavelet–Galerkin methods: An adapted biorthogonal wavelet basis, *Constructive Approximation* **9** (1993), 237–262.
2. S. Dahlke and I. Weinreich, Wavelet bases adapted to pseudodifferential operators, *Applied and Computational Harmonic Analysis* **1** (1994), 267–283.
3. S. Dahlke, A note on generalized Weyl–Heisenberg frames, *Applied Mathematics Letters* **7(3)** (1994), 79–82.
4. S. Dahlke, W. Dahmen, and V. Latour, Smooth refinable functions and wavelets obtained by convolution products, *Applied and Computational Harmonic Analysis* **2** (1995), 68–84.
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6. S. Dahlke and P. Maass, The affine uncertainty principle in one and two dimensions, *Computers and Mathematics with Applications* **30(3–6)** (1995), 293–305.
7. S. Dahlke and V. Latour, A note on the linear independence of characteristic functions of self–similar sets, *Archiv der Mathematik* **66** (1996), 80–88.
8. S. Dahlke and P. Maass, Continuous wavelet transforms with applications to analyzing functions on spheres, *Journal of Fourier Analysis and Applications* **2(4)** (1996), 379–396.

9. S. Dahlke, Invariant manifolds for products of random diffeomorphisms, *Journal of Dynamics and Differential Equations* **9(1)** (1997), 157–210.
10. S. Dahlke, V. Latour, and M. Neeb, Generalized cardinal B-Splines: Stability, linear independence, and appropriate scaling matrices, *Constructive Approximation* **13** (1997), 29–56.
11. S. Dahlke and R. DeVore, Besov regularity for elliptic boundary value problems, *Communications in Partial Differential Equations* **22(1&2)** (1997), 1–16.
12. S. Dahlke, W. Dahmen, R. Hochmuth, and R. Schneider, Stable multiscale bases and local error estimation for elliptic problems, *Applied Numerical Mathematics* **23(1)** (1997), 21–48.
13. S. Dahlke and P. Maass, Interpolating refinable functions and wavelets for general scaling matrices, *Numerical Functional Analysis and Optimization* **18(5&6)** (1997), 521–539.
14. S. Dahlke, Besov regularity for elliptic boundary value problems with variable coefficients, *Manuscripta Mathematica* **95** (1998), 59–77.
15. S. Dahlke, Besov regularity for interface problems, *Zeitschrift für Angewandte Mathematik und Mechanik* **79(6)** (1999), 383–388.
16. S. Dahlke, Besov regularity for elliptic boundary value problems on polygonal domains, *Applied Mathematics Letters* **12(6)** (1999), 31–38.
17. S. Dahlke, K. Gröchenig, and P. Maass, A new approach to interpolating scaling functions, *Applicable Analysis* **72(3–4)** (1999), 485–500.
18. S. Dahlke, R. Hochmuth, and K. Urban, Adaptive wavelet methods for saddle point problems, *Mathematical Modelling and Numerical Analysis (M2AN)* **34(5)** (2000), 1003–1022.
19. A. Barinka, T. Barsch, P. Charton, A. Cohen, S. Dahlke, W. Dahmen, and K. Urban, Adaptive wavelet schemes for elliptic problems – Implementation and numerical experiments, *SIAM Journal on Scientific Computing* **23(3)** (2001), 910–939.
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22. A. Barinka, T. Barsch, S. Dahlke, M. Konik, and M. Mommer, Quadrature formulas for refinable functions and wavelets II: Error analysis, *Journal of Computational Analysis and Applications* **4(4)** (2002), 339–362.
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24. S. Dahlke, Besov regularity of edge singularities for the Poisson equation in polyhedral domains, *Numerical Linear Algebra with Applications* **9(6–7)** (2002), 457–466.
25. S. Dahlke, W. Dahmen, and K. Urban, Adaptive wavelet methods for saddle point problems: Optimal convergence rates, *SIAM Journal on Numerical Analysis* **40(4)** (2002), 1230–1262.
26. S. Dahlke, P. Maass, and G. Teschke, Reconstruction of wideband reflectivity densities by wavelet transforms, *Advances in Computational Mathematics* **18(2-4)** (2003), 189–209.
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28. K. Böhmer and S. Dahlke, Stability and convergence for discretization methods with applications to wavelet Galerkin schemes, *International Journal of Pure and Applied Mathematics* **6(4)** (2003), 465–489.
29. S. Dahlke, V. Lehmann, and G. Teschke, Applications of wavelet methods to the analysis of meteorological radar data – An overview, *Arabian Journal for Science and Engineering* **28(1C)** (2003), 3–44.
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31. A. Barinka, S. Dahlke, and W. Dahmen, Adaptive application of operators in standard representation, *Advances in Computational Mathematics* **24(1-4)** (2006), 5–34.
32. S. Dahlke, G. Steidl, and G. Teschke, Weighted coorbit spaces and Banach frames on homogeneous spaces, *Journal of Fourier Analysis and Applications* **10(5)** (2004), 507–539.
33. S. Dahlke, M. Fornasier, and T. Raasch, Adaptive frame methods for elliptic operator equations, *Advances in Computational Mathematics* **27(1)** (2007), 27–63.
34. S. Dahlke, E. Novak, and Winfried Sickel, Optimal approximation of elliptic problems by linear and nonlinear mappings I, *Journal of Complexity* **22** (2006), 29–49.
35. S. Dahlke, E. Novak, and Winfried Sickel, Optimal approximation of elliptic problems by linear and nonlinear mappings II, *Journal of Complexity* **22** (2006), 549–603.
36. S. Dahlke, M. Fornasier, H. Rauhut, G. Steidl, and G. Teschke, Generalized coorbit theory, Banach frames, and the relation to α -modulation spaces, *Proceedings of the London Mathematical Society* **96** (2008), 464–506.
37. S. Dahlke, M. Fornasier, T. Raasch, R. Stevenson, and M. Werner, Adaptive frame methods for elliptic operator equations: The steepest descent approach, *IMA Journal of Numerical Analysis* **27(4)** (2007), 717–740.

38. S. Dahlke, D. Lorenz, P. Maass, C. Sagiv, and G. Teschke, The canonical states associated with quotients of the affine Weyl–Heisenberg group, *Journal of Applied Functional Analysis* **3(2)** (2008), 215–232.
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40. S. Dahlke, G. Steidl, and G. Teschke, Frames and coorbit theory on homogeneous spaces with special guidance on the sphere, *Journal of Fourier Analysis and Applications* **13(4)** (2007), 387–403.
41. S. Dahlke, G. Kutyniok, P. Maass, C. Sagiv, H.-G. Stark, and G. Teschke, The uncertainty principle associated with the continuous shearlet transform, *International Journal of Wavelets, Multiresolution and Information Processing* **6(2)** (2008), 157–181.
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43. S. Dahlke and G. Teschke, Coorbit theory, multi- α -modulation frames and the concept of joint sparsity for medical multi-channel data analysis, *EURASIP Journal on Advances in Signal Processing*, ID 471601.
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50. S. Dahlke, G. Steidl, and G. Teschke, Shearlet coorbit spaces: Compactly supported analyzing shearlets, traces and embeddings, *Journal of Fourier Analysis and Applications*. **17(6)** (2011), 1232–1255,

51. S. Dahlke and W. Sickel, On Besov regularity of solutions to nonlinear elliptic partial differential equations, *Revista Matemática Complutense* (2012) DOI:10.1007/s13163-012-0093-z.
52. S. Dahlke, S. Häuser, and G. Teschke, Coorbit space theory for the Toeplitz shearlet transform, *International Journal of Wavelets, Multiresolution and Information Processing* **10(4)** (2012), DOI 10.1142/S0219691312500373.
53. P. Cioca, S. Dahlke, S. Kinzel, F. Lindner, T. Raasch, K. Ritter, and R. Schilling, Spatial Besov regularity of stochastic partial differential equation on Lipschitz domains, *Studia Mathematica* **207(3)** (2011), 197–234.
54. P. Cioca, S. Dahlke, S. Kinzel, F. Lindner, N. Döhring, T. Raasch, K. Ritter, and R. Schilling, Adaptive wavelet methods for elliptic stochastic partial differential equations, *BIT* **52(3)** (2012), 589–614, DOI 10.1007/s10543-011-0368-7.
55. P. Cioica and S. Dahlke, Spacial Besov regularity for semilinear stochastic partial differential equations, *International Journal of Computer Mathematics* **89(18)** (2012), 2443–2459, Special issue: Recent advances on the numerical solutions of stochastic partial differential equations, DOI: 10.1080/0020716.2011.631530.
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62. P. Rashkov, B. Schmitt, L. Sogaard-Andersen, P. Lenz, and S. Dahlke, A Model for ‘Antagonistic’ Protein Dynamics, *International Journal for Biomathematics & Biostatistics*. **2(1)** (2013), 75–85.

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64. P. Rashkov, B. Schmitt, D. Kehlberg, L. Sogaard-Andersen und S. Dahlke, A model for spatio-temporal dynamics in a regulatory network for cell polarity, *Mathematical Biosciences* **258** (2014), 189–200, ISSN 0025-5564.
65. S. Dahlke, M. Fornasier, U. Friedrich, and T. Raasch, Multilevel preconditioning for sparse optimization of functionals with nonconvex fidelity terms, *Journal of Inverse and Ill-Posed Problems* **23(4)** (2015), 393–414.
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67. S. Dahlke, F. de Mari, E. de Vito, D. Labate, G. Steidl, G. Teschke, and S. Vigogna, Coorbit spaces with voice in a Frechet space, *Journal of Fourier Analysis and Applications* **23(1)** (2017), 141–206.)
68. S. Dahlke, L. Diening, C. Hartmann, B. Scharf, and M. Weimar, Besov regularity of solutions to the p-Poisson equation, *Nonlinear Analysis Series A: Theory, Methods & Applications* **130** (2016), 298–329, DOI 10.1016/j.na.2015.10.015.
69. P. Cioica-Licht, S. Dahlke, N. Döhring, U. Friedrich, S. Kinzel, F. Lindner, T. Raasch, K. Ritter, and R. Schilling, On the convergence analysis of the inexact linearly implicit Euler scheme for a class of SPDEs, *Potential Analysis* **44(3)**(2016), 473–495, DOI 10.1007/s11118-015-9510-5.
70. S. Dahlke, D. Lellek, S. Hong Lui, and R. Stevenson, Adaptive wavelet Schwarz method for the Navier-Stokes equation, *Numerical Functional Analysis and Optimization* **37(10)** (2016), 1213–1234.
71. S. Dahlke, P. Keding, and T. Raasch, Quarkonial frames with compression properties, *Calcolo* **54(3)** (2017), 823-855, DOI: 10.1007/s10092-016-0210-3.
72. G.S. Alberti, S. Dahlke, F. de Mari, E. de Vito, S. Vigogna, Continuous and discrete frames generated by the evolution flow of the Schödinger equation, *Analysis and Applications* **15(6)** (2017), 915-937, DOI: 10.1142/S021953051750004X
73. F. Eckhardt, P.A. Cioica-Licht, and S. Dahlke, Besov regularity for the stationary Navier–Stokes equation on bounded Lipschitz domains, *Applicable Analysis* **97(3)** (2018), 466–485, DOI: 10.1080/00036811.2016.1272103.
74. K. Schenk, A.B. Hervas, T. Rösch, M. Eisemann, B.A. Schmitt, S. Dahlke, L. Kleine Borgmann, S.M. Murray, and P.L. Graumann, Rapid turnover of DnaA at replication origin regions contributes to initiation control of DNA replication, *PLoS Genetics* **13(2)**: e1006561. <https://doi.org/10.1371/journal.pgen.1006561>.

75. S. Dahlke, N. Döhring, and S. Kinzel, A class of random functions in non-standard smoothness spaces, *Vietnam Journal of Mathematics*, DOI: 10.1007/s10013-017-0258-7.
76. M. Speckbacher, D. Bayer, S. Dahlke, and P. Balazs, The α -modulation transform: Admissibility, coorbit theory, and frames of compactly supported functions, *Monatshefte der Mathematik* **184** (2017), 133–169, DOI: 10.1007/s00605-017-1085-3.
77. S. Dahlke, H. Harbrecht, M. Utzinger, and M. Weimar, Adaptive wavelet BEM for boundary integral equations: Theory and numerical experiments, *Numerical Functional Analysis and Optimization* **39(2)** (2018), 208–232, DOI: 10.1080/01630563.2017.1359623.
78. H. Karbalaali, A. Javaherian, S. Dahlke, and S. Torabi, Channel boundary detection based on 2D shearlet transformation - An Application to the seismic data in the South Caspian Sea, *Journal of Applied Geophysics* **146** (2017), 67–79, DOI: 10.1016/j.jappgeo.2017.09.001.
79. H. Karbalaali, A. Javaherian, S. Torabi, and S. Dahlke, Channel characterization using 2D complex shearlet transform: A case study from the south of Caspian Sea, to appear in: *Exploration Geophysics*.
80. H. Karbalaali, A. Javaherian, S. Dahlke, R. Reisenhofer, and S. Torabi, Seismic channel edge detection using 3D shearlets – A study on synthetic and real channelized 3D seismic data, to appear in: *Geophysical Prospecting*.

Publications in Proceedings:

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2. S. Dahlke, Multiresolution analysis and wavelets on locally compact Abelian groups, in: “Wavelets, Images, and Surface Fitting” (P. J. Laurent, A. Le Méhauté, and L. L. Schumaker, Eds.), A K Peters, Wellesley, Massachusetts, 1994, 141–156.
3. S. Dahlke, Multiresolution analysis, Haar bases and wavelets on Riemannian manifolds, in: “Wavelets: Theory, Algorithms, and Applications” (C. K. Chui, L. Montefusco, and L. Puccio, Eds.), Academic Press, 1994, 33–52.
4. S. Dahlke, The construction of wavelets on groups and manifolds, in: “General Algebra and Discrete Mathematics” (K. Denecke and O. Lüders, Eds.), Heldermann-Verlag, Berlin, 1995, 47–58.
5. S. Dahlke, K. Gröchenig, and V. Latour, Biorthogonal box spline wavelet bases, in: “Surface Fitting and Multiresolution Methods” (A. Le Méhauté, C. Rabut, and L. L. Schumaker, Eds.), Vanderbilt University Press, Nashville, 1997, 83–92.
6. S. Dahlke and A. Kunoth, Wavelet characterizations of function spaces on skeletons, in: Proceedings of the International Wavelet Conference “Wavelets and Multiscale Methods”, INRIA, Tanger, Marokko, 1998.

7. S. Dahlke, Besov regularity for the Stokes problem, in: “Advances in Multivariate Approximation” (W. Haußmann, K. Jetter, and M. Reimer, Eds.), Wiley VCH, Mathematical Research 107, Berlin, 1999, 129-138.
8. S. Dahlke, R. Hochmuth, and K. Urban, Convergent adaptive wavelet methods for the Stokes problem, in: “Multigrid Methods VI”, Proceedings of the Sixth European Multigrid Conference 1999, (E. Dick, K. Rienslagh, and J. Vierendeels, Eds.), Springer Lect. Notes Comput. Sci. Eng. **14**, 2000, 66–72.
9. S. Dahlke and P. Maass, An outline of adaptive wavelet Galerkin methods for Tikhonov regularization of inverse parabolic problems, in: “Recent Development in Theory & Numerics, Proceedings of the International Conference on Inverse Problems”, Hong Kong, 2002, World Scientific Publishers, 56–66.
10. S. Dahlke, Besov regularity for the Neumann problem, in “Function Spaces, Differential Operators, and Nonlinear Analysis, The Hans Triebel Anniversary Volume” (D. Haroske, T. Runst, and H.–J. Schmeisser, Eds.), Birkhäuser, Basel–Boston–Berlin, 2003, 267–277.
11. S. Dahlke, M. Lindemann, G. Teschke, M. Zhariy, M.J. Soares, P. Cerejeiras, and U. Kähler, A wavelet Galerkin scheme for nonlinear elliptic partial differential equations, IKM Proceedings, Weimar, 2003.

Books:

1. S. Dahlke, W. Dahmen, M. Griebel, W. Hackbusch, K. Ritter, R. Schneider, C. Schwab, and H. Yserentant, *Extraction of Quantifiable Information from Complex Systems*, Lecture Notes in Computational Science and Engineering **102**, Springer, 2014.
2. S. Dahlke, F. De Mari, P. Grohs, and D. Labate, *Harmonic and Applied Analysis: From Groups to Signals*, Birkhäuser Series Applied and Numerical Harmonic Analysis, Birkhäuser 2015.

Book Chapters:

1. S. Dahlke, W. Dahmen, and R. DeVore, Nonlinear approximation and adaptive techniques for solving elliptic operator equations, in: “Multiscale Wavelet Methods for Partial Differential Equations” (W. Dahmen, A. Kurdila, and P. Oswald, Eds.), Academic Press, San Diego, 1997, 237–283.
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3. S. Dahlke and W. Sickel, Besov regularity for the Poisson equation in domains with smooth and polyhedral cones, in: “Sobolev Spaces in Mathematics II: Applications to Partial Differential Equations”, International Mathematical Series, Vol.9, (V. Mazya, Ed.), Springer, 2008, jointly published with Tamara Rozhkovskaya Publisher, Novosibirsk, 123–146.
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Submitted:

1. H. Karbalaali, A. Javaherian, F. Qayyum, P. de Groot, S. Dahlke, and S. Torabi, Identification of shallow geohazard channels based on seismic attributes in the South Caspian Sea, Preprint 2017.
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- 3- S. Dahlke, U. Friedrich, P. Keding, T. Raasch, and A. Sieber, Adaptive quarkonial domain decomposition methods for elliptic partial differential equations, Bericht Nr. 2018–1, Fachbereich Mathematik und Informatik, Philipps–Universität Marburg 2018.

Software Documentations:

1. A. Barinka, S. Dahlke, and N. Mulders, The IGPM–Villemoes machine, IGPM–Bericht Nr. 184, RWTH Aachen, 2000.

Further Publications:

1. S. Dahlke, Invariant families of submanifolds for diffeomorphisms, Report Nr. 192, University of Bremen, 1988.
2. S. Dahlke, W. Dahmen, R. DeVore, R. Hochmuth, and R. Schneider, Wavelet Galerkin Verfahren: Adaptive Strategien, a posteriori Fehlerschätzer und Besov–Regularität, in: “Wavelet–Approximation und Anwendungen”, Preprint Medizinische Universität Lübeck, 1996, 114–123.
3. S. Dahlke, G. Steidl, and G. Teschke, Weighted coorbit spaces and Banach frames on homogeneous spaces, *Oberwolfach Reports* **1(2)** (2004), 1383–1386.
4. S. Dahlke and P. Maass, Adaptive multi-scale methods for inverse problems, *Oberwolfach Reports* **1(3)** (2004), 1819–1820.
5. S. Dahlke, E. Novak, and W. Sickel, Optimal approximation of elliptic problems II: Wavelet methods, Algorithm and Complexity for Continuous Problems, Seminar 04401, Schloss Dagstuhl, 2004, <http://www.dagstuhl.de/files/Materials/04/04401/04401.DahlkeStephan.ExtAbstract!.pdf>
6. S. Dahlke, M. Fornasier, and T. Raasch, Adaptive frame methods for elliptic operator equations, 76. GAMM-Jahrestagung, Luxemburg, 2005, *Proceedings in Applied Mathematics and Mechanics* **5(1)** (2005), 763–764, <http://www3.interscience.wiley.com/cgi-bin/jhome/91016652>
7. S. Dahlke, M. Fornasier, T. Raasch, R. Stevenson, and M. Werner, Adaptive frame methods for elliptic operator equations, *Oberwolfach Reports* **36** (2007), 2094–2097.
8. S. Dahlke, G. Steidl, and G. Teschke, The continuous shearlet transform in arbitrary space dimensions, Structured Decompositions and Efficient Algorithms, Seminar 08492, Schloss Dagstuhl, 2008, <http://drops.dagstuhl.de/opus/volltexte/2009/1921/>

9. S. Dahlke, G. Steidl, and G. Teschke, Shearlet coorbit spaces I: General setting (in arbitrary space dimensions), *Oberwolfach Reports* **44** (2010), DOI: 10.4171/OWR/2010/44
10. S. Dahlke, G. Steidl, and G. Teschke, Shearlet coorbit spaces I: General setting (in arbitrary space dimensions), *Oberwolfach Reports* **17** (2011), DOI: 10.4171/OER/2011/17
11. S. Dahlke, G. Steidl, and G. Teschke, Shearlet coorbit spaces: Traces and embeddings in higher dimensions), *Oberwolfach Reports* **29** (2012), DOI: 10.4171/OWR/2012/29
12. C. Nell, K. Kehr, A. Rembert Koczulla, T. Greulich, U. Koehler, and S. Dahlke, R Peak detection of the ECG using the dyadic wavelet transform modulus maxima method, Preprint, April 2013
13. P. Cioica, S. Dahlke, N. Döhring, S. Kinzel, F. Lindner, T. Raasch, K. Ritter, and R. Schilling, Adaptive wavelet methods for SPDEs: Theoretical analysis and practical realization, *Oberwolfach Reports* **39** (2013), 2200–2003, DOI: 10.4171/OWR/2013/39
14. S. Dahlke, G. Kutyniok, R. Stevenson, and E. Süli, New discretization methods for the numerical approximation of PDEs, *Oberwolfach Reports* **2/2015**, DOI: 10.4171/OWR/2015/2
15. S. Dahlke, Quarklet frames in adaptive numerical schemes, *Oberwolfach Reports* **4/2017** 10–12, DOI: 10.4171/OWR/2017/4.

Non-Mathematical Publications:

1. S. Dahlke, *Seelenspiegelungen*, Gedichte, Verlag Blaues Schloss, ISBN 978-3-943556-62-9.

Teaching Experiences

Lectures:

- *Riemannian Geometry*, FU Berlin, SS 1990
- *Wavelets: Theory and Applications I*, FU Berlin, WS 1990/91
- *Wavelets: Theory and Applications II*, FU Berlin, SS 1991
- *Ergodic Theory*, FU Berlin, WS 1991/92
- *Wavelets: Theory and Applications*, RWTH Aachen, WS 1996/97
- *Differential Equations and Numerical Analysis*, RWTH Aachen, SS 97
- *Wavelet Methods in Signal Analysis/Compression*, RWTH Aachen, SS 98
- *Regularity Theory for Partial Differential Equations*, RWTH Aachen, SS 99
- *Optimization*, Justus–Liebig–University of Gießen, SS 00

- *Wavelet Analysis and Applications*, Justus–Liebig–University of Gießen, SS 00
- *Mathematics for Engineers*, University of Bremen, WS 01/02
- *Numerical Analysis I*, SS 02, SS 05, SS 08, SS 11, SS 13, SS 15
- *Wavelet Analysis I*, SS 02, SS 04, WS 06/07, SS 12, SS 16
- *Numerical Analysis II*, WS 02/03, WS 04/05, WS 05/06, WS 08/09, WS 11/12, WS 13/14, WS 14/15, WS 15/16, WS 16/17, WS 17/18
- *Wavelet Analysis II*, WS 02/03, WS 04/05, SS 07, WS 10/11
- *Specific Problems in Numerical Analysis*, SS 03
- *Analysis I*, WS 03/04
- *Analysis II*, SS 04
- *Applied Functional Analysis*, WS 06/07, SS 09, SS 16
- *Linear Algebra II*, SS 07, SS 12, SS 17
- *Analysis III*, WS 07/08
- *Computer Aided Geometric Design*, WS 07/08
- *Regularity Theory for Partial Differential Equations*, SS 08, WS 14/15, WS 16/17
- *Numerical Treatment of Elliptic Partial Differential Equations*, SS 09, SS 11, SS 13, SS 15, SS 17
- *Approximation Theory* , WS 09/10, WS 12/13
- *Adaptive Numerical Methods for Operator Equations*, WS 09/10, WS 11/12, WS 13/14, WS 15/16, WS 17/18

Seminars:

- *Seminar on Wavelets and Applications*, FU Berlin, WS 1991/92
- *Post-Graduate Seminar on Multilevel Methods*, RWTH Aachen, WS 1996/97
- *Seminar on Numerical Analysis*, RWTH Aachen, SS 97
- *Seminar on Multilevel Methods and Wavelets*, RWTH Aachen, WS 97/98, SS 98, WS 98/99, SS 99, WS 99/00, WS 00/01
- (with P. Maass) *Post-Graduate Seminar on Wavelet Analysis and Inverse Problems*, WS 01/02

- (with W. Gromes and B. Schmitt) *Seminar on Numerical Analysis*, SS 02, WS 02/03, SS 03, WS 03/04, SS 04, WS 04/05, SS 05, WS 05/06, WS 06/07
- (with W. Gromes and B. Schmitt) *Post-Graduate Seminar on Wavelet Analysis*, WS 04/05, SS 05, WS 05/06
- (with E. Kostina and B. Schmitt) *Post-Graduate Seminar on Numerical Analysis and Optimization*, WS 06/07, SS 07, WS 07/08, SS 09, WS 09/10, WS 11/12, SS 12
- (with E. Kostina and B. Schmitt) *Seminar on Numerical Analysis and Optimization*, WS 06/07, SS 07, WS 07/08, SS 08, SS 09, SS 11
- Proseminar *Fourier Transformation*, SS 05
- (with K. Böhmer, M. Buhmann, R. Eckhorn, T. Sauer, and B. Schmitt) *Post-Graduate Seminar Marburg - Giessen on Approximation Theory and Numerical Analysis*, WS 02/03, SS 03, WS 03/04, SS 04, WS 04/05, SS 05, SS 06, WS 06/07
- (with E. Kostina and B. Schmitt) *Mathematical Models in Biology*, WS 08/09
- (with B. Eckhardt and H. Upmeyer) *Symplectic Geometry and Hamiltonian Systems*, WS 08/09
- (with H. Holzmann, E. Kostina, and B. Schmitt) *Sparse Solutions and Sparse Modeling*, WS 09/10
- (with B. Schmitt) *Seminar on Numerical Analysis*, WS 10/11, WS 11/12, SS 12, WS 12/13, SS 13, WS 13/14, SS 15
- (with B. Schmitt and S. Dereich), *Post-Graduate Seminar on Stochastics and Numerical Analysis*, WS 10/11
- (with S. Dereich and K. Ritter), *Seminar on Stochastic Partial Differential Equations*, WS 10/11
- (with H. Holzmann and B. Schmitt), *Seminar on Inverse Problems*, WS 14/15
- (with B. Schmitt and M. Weimar) *Post-Graduate Seminar on Numerical Analysis*, WS 14/15, SS 15, WS 15/16
- *Seminar on Numerical Analysis*, WS 15/16
- (with G. Pfander) *Seminar on Numerical Analysis*, SS 16, WS 16/17
- (with G. Pfander and M. Weimar) *Post-Graduate Seminar on Numerical Analysis*, SS 16
- (with G. Pfander) *Post-Graduate Seminar on Numerical Analysis*, WS 16/17
- (with T. Surowiec) *Post-Graduate Seminar on Numerical Analysis*, SS 17, WS 17/18
- (with T. Surowiec) *Seminar on Numerical Analysis*, SS 17, WS 17/18

Further Teaching Experiences:

- WE-Heraeus Summer School: *Mathematische Methoden und Computeralgebra in der Physik*, Martin-Luther-University of Halle-Wittenberg, 14. – 25. September 1998
- *Wavelet-Analysis: Theory and Applications*, Potsdam Summer School, 5. – 9. October 1998, jointly with A. Cohen and P. Maass
- WE-Heraeus Summer School *Nichtlineare Dynamik in der Physik der Umwelt*, University of Potsdam, 4. – 15. September 2000
- Annual Meeting DFG Priority Program 1114 “Mathematical Methods in Time Series Analysis and Digital Image Processing” Reisenburg, Günzburg, 25. February – 2. March 2002
- *An Introduction to Chaos Theory*, Preparatory Course, WS 02/03
- Workshop *Approximation, Complexity, and Function Spaces* of the Graduate College “Approximation und algorithmische Verfahren”, Friedrich-Schiller-University of Jena, 7. – 11. October 2004
- Workshop *Applied Harmonic Analysis*, University of Genova, 2. – 6. September 2013
- Joint ICTP-TWAS School on *Coherent State Transforms, Time-Frequency and Time-Scale Analysis, Applications*, Trieste, 2. – 20. June 2014
- *Four Lectures on Shearlet Coorbit Theory*, Philipps-University of Marburg, 4. – 10. October 2016

Supervision of Diploma Theses

Former Diploma Students:

- Manuela Doniat, *Wavelets auf Mannigfaltigkeiten*, RWTH Aachen, 2003
- Markus Jürgens, *Adaptive Wavelet-Verfahren auf allgemeinen Gebieten*, RWTH Aachen, 2001
- Niklas Wolf von der Sahl, *Auswertung von Radar-Daten mittels Wavelets*, University of Bremen, 2003
- Elmar Völker, *Adaptive Wavelet-Verfahren für Integralgleichungen auf dem Torus*, Philipps-University of Marburg, 2004
- Markus Hampel, *Entrauschen mittels Frames*, Philipps-University of Marburg, 2005
- Manuel Werner, *Adaptive Frame-Verfahren für elliptische Randwertprobleme*, Philipps-University of Marburg, 2005
- Sarah Rose, *Wavelet-Verfahren zur statistischen Analyse und Prognose von Zeitreihen*, Philipps-University of Marburg, 2005

- Regina Hesse, *Adaptive Gittersteuerung bei gewöhnlichen Differentialgleichungen*, Philipps-University of Marburg, 2005
- Silvia Ockenfels, *Die Anpassung von Wavelets an Differentialoperatoren*, Philipps-University of Marburg, 2005
- Danny Lützelberger, *Numerische Behandlung spezieller Modelle für Investitions-Optionen*, Philipps-University of Marburg, 2005
- Benjamin Hofmann, *Adaptive Frame-Verfahren für elliptische partielle Differentialgleichungen vierter Ordnung*, Philipps-University of Marburg 2007
- Andreas Schneider, *Konstruktion von Multiwavelets und Anwendungen bei adaptiven numerischen Verfahren*, Philipps-University of Marburg 2007
- Katrin Röder, *Kapazitätsplanung virtualisierter IT-Ressourcen*, Philipps-University of Marburg 2007
- Ulrich Friedrich, *Nichtüberlappende Gebietszerlegungsverfahren für elliptische partielle Differentialgleichungen*, Philipps-University of Marburg 2008
- Thomas Meinl, *Konstruktion multivariater Skalierungsvektoren*, Philipps-University of Marburg 2007
- Thomas Künzel, *Nichtlineare Diffusionsverfahren: Theoretische Analysis und Anwendungen bei Strömungssimulationen*, Philipps-University of Marburg 2007
- Simone Geisel, *Entrauschungsverfahren mittels nichtseparabler Wavelets für allgemeine Skalierungen*, Philipps-University of Marburg 2008
- Simon Wiesler, *Lokale Regularitätsabschätzungen mittels stetiger Wavelet-Transformation*, Philipps-University of Marburg 2008
- Simon Göbel, *Multifraktale Eigenschaften von Levi-Prozessen*, Philipps-University of Marburg 2008
- Amin Khodabakhsh, *Stochastische Modellierung des Spotpreisprozesses und Bewertung von virtuellen Gasspeicherkapazitäten*, Philipps-University of Marburg 2009
- Petru Cioica, *Konvergenzraten von Raum-Zeit-Approximationen für stochastische Evolutionsgleichungen*, Philipps-University of Marburg 2009
- Dominik Lellek, *Adaptive Frame-Verfahren für elliptische Operatorgleichungen: Verfeinerungen und neue Strategien*, Philipps-University of Marburg 2010
- Frank Eckhard, *Besov-Regularität elliptischer Randwertprobleme*, Philipps-University of Marburg 2011
- Rebecca Ramb, *Graphical Models in Time Series: From Basic Concepts to Latent Variables*, Philipps-University of Marburg 2011

- Svenja Schenkel, *Comparison and Analysis of Modern Models for Evaluating Synthetic Collateralized Debt Obligations*, Philipps–University of Marburg 2011
- Fabian Feise, *Struktur und Eigenschaften von Shearlet Coorbit Räumen* Philipps–University of Marburg 2012
- Lufeng Yan, *Analyse und Implementierung divergenzfreier Waveletbasen*, Philipps–University of Marburg 2013
- Xiaoyin Chen, *Zur Konstruktion und Theorie divergenzfreier Waveletbasen* Philipps–University of Marburg 2013
- Lydia Großhennig, *Konstruktion des Daubechies–Wavelets*

Supervision of Master Theses

Former Master Students:

- Evgenia Heiner, *Stochastische Evolutionsgleichungen in Banachräumen*, Philipps–University of Marburg 2013
- Christoph Nell, *Analyse von EKG-Daten mittels Wavelets*, Philipps–University of Marburg 2012
- Verena Horn, *Konstruktion glatter verfeinerbarer Funktionen mittels Faltungen*, Philipps–University of Marburg 2013
- Noci Jorde, *Die Anwendung von ISTA auf inverse Probleme in der Elektroimpedanztomographie* , Philipps–University of Marburg 2013
- Philipp Keding, *Charakterisierung von Besov–Räumen mittels Wavelet–Entwicklungen*, Philipps–University of Marburg 2014
- Catarina Lippmann, *Shearlet-Coorbit-Räume: Gruppentheoretische Grundlagen und Spursätze*, Philipps–Universität Marburg 2014
- Johann Cordes, *Besov–Regularität elliptischer Randwerte in polygonalen Gebieten*, Philipps–University of Marburg 2015
- Henning Zickermann, *Strategien zur Optimalität von adaptiven Wavelet–Verfahren für lineare Operatorgleichungen*, Philipps–University of Marburg 2015
- Christian Lange, *Zur asymptotischen Optimalität des additiven Schwarz–Verfahrens* , Philipps–University of Marburg, 2015
- Katharina Dunst, *Optimierungsprobleme in der Logistik*, Philipps–University of Marburg, 2015
- Charlotte Prenzer, *Optimale Approximation elliptischer Probleme*, Philipps–University of Marburg, 2015

- Lukas Sawatzki, *Whitney-Ungleichungen bei lokaler anisotroper Polynomapproximation*, Philipps-University of Marburg, 2016
- Anna-Katharina Kröck, *Adaptive Quarklet-Verfahren für periodische Randwertprobleme* Philipps-University of Marburg, 2017
- Alexander Sieber, *Adaptive Quarklet-Verfahren für Dirichlet-Randwertprobleme* Philipps-University of Marburg, 2017
- Deborah Gahururu, *Adaptive Wavelet-Verfahren für parabolische partielle Differentialgleichungen* Philipps-University of Marburg, 2017
- Lukas Peter, *Adaptive Frame-Verfahren für elliptische partielle Differentialgleichungen*, Philipps-University of Marburg, 2017
- Martina Seibert, *Das Shearlet-Unschärferprinzip*, Philipps-University of Marburg, 2017
- Hannah Jeckel, *Mathematical Modells of Bacterial Swarm Dynamics*, Philipps-University of Marburg, 2018
- Sven Heuer, *Entwicklung von Algorithmen zur Fußgängerdetektion mittels CNN und Shearlets* Philipps-University of Marburg, 2018

Current Master Students:

- Lukas Becker, *Adaptive Quarklet-Verfahren für Neumann-Randwertprobleme*
- Marcus Meyer, *Ein Vergleich verschiedener Shearlet-Verfahren zur Kantenerkennung*

Bachelor Theses

Former Bachelor Students:

- Stefan Laun, *Bernstein-Polynome und Brownsche Bewegung*, Philipps-University of Marburg 2008
- Rhena Helmus, *Die stetige Shearlet-Transformation*, Philipps-University of Marburg 2009
- Philipp Werth, *Adaptive Approximation reeller Funktionen*, Philipps-University of Marburg 2011
- Catharina Lippmann, *Die Töplitz-Shearlet-Transformation*, Philipps-University of Marburg 2012
- David Göttlicher, *Existenz und Eigenschaften von Gabor-Frames*, Philipps-University of Marburg 2012

- Michael Leupold, *Effiziente Berechnung von Produkten von Splinefunktionen*, Philipps-University of Marburg 2012
- Johann Cordes, *Zur Konditionsproblematik bei Differenzenverfahren*, Philipps-University of Marburg 2012
- Christian Lange, *Sobolev-Regularitätsabschätzungen für elliptische partielle Differentialgleichungen*, Philipps-University of Marburg 2012
- Laura Fee Schneider, *Ein mathematisches Modell für quasiperiodische Oszillationen von Proteinen in Bakterien*, Philipps-University of Marburg 2012
- Rabea Fee Griese, *Das Antagonisten-Szenarium für Proteinoszillationen in Bakterien*, Philipps-University of Marburg 2012
- He Hong, *Konvergenzanalyse inexakter Iterationsverfahren zur Lösung von linearen Gleichungssystemen*, Philipps-University of Marburg 2013
- Sasha Zhou, *Grundlagen der Shearlet-Theorie*, Philipps-University of Marburg 2013
- Martina Seibert, *Das affine Unschärfepinzipp*, Philipps-University of Marburg 2013
- Margarita Roth, *Rekonstruktion von Reflexionsdichten mittels Wavelets*, Philipps-University of Marburg 2013
- Alexander Siebert, *Konstruktion stochastischer Prozesse in Besov-Räumen mittels Wavelet-Entwicklungen*, Philipps-University of Marburg 2014
- Richard Eggert, *Zur Konvergenz von Fourier-Reihen*, Philipps-University of Marburg, 2015
- Jana Holznigenkemper, *Zur Konstruktion von Spline-Wavelets*, Philipps-University of Marburg, 2015
- Lukas Becker, *Das inexakte Newton-Verfahren*, Philipps-University of Marburg, 2015
- Joachim Lübbers, *Parameterstudien bei dynamischen Modellen zur Proteinoszillation*, Philipps-University of Marburg, 2015
- Sven Heuer, *Konvergenz von Schwarz-Gebietszerlegungsverfahren*, Philipps-University of Marburg, 2015
- Julia Michaely, *Zur Konvergenzanalyse des geometrischen Multigrid-Verfahrens*, Philipps-University of Marburg, 2015
- Elena Piks, *Rekonstruktion von Reflexionsdichten im Narrowband-Regime*, Philipps-University of Marburg, 2016
- Julia Turetska, *Coherent States bei Quotienten von affinen Weyl-Heisenberg Gruppe, n* Philipps-University of Marburg, 2016
- Jiao Liu, *Die Babuska-Shen-Basis*, Philipps-University of Marburg, 2016

- Annika Reinhardt, *Unschärferelationen in der Zeit-Frequenz-Analyse*, Philipps-Universität Marburg 2016
- Franziska Vaupel, *Regularitätsabschätzungen verfeinerbarer Funktionen*, Philipps-Universität Marburg 2016
- Tabea Henning, *Die Grundlagen der Distributionentheorie*, Philipps-Universität Marburg 2016
- Jennifer Lippert, *Finite-Differenzen-Methode für ein Testmodell zur Proteinlokalisierung in Bakterien*, Philipps-Universität Marburg 2016
- Johanna Grütering, *Ein Vergleich verschiedener Iterationsverfahren*. Philipps-Universität Marburg 2016
- Fabian Schaum, *Spline-Wavelets für gewöhnliche Differentialgleichungen*, Philipps-Universität Marburg 2016
- Henrike Adrian, *Das Wiener-Lemma*, Philipps-Universität Marburg 2017
- Leonie Löcherbach, *Zur Konstruktion interpolierender Skalierungsfunktionen*, Philipps-Universität Marburg 2017
- Carolin Umathum, *Zur Konstruktion kompakt getragener Spline Wavelets*, Philipps-Universität Marburg 2017
- Muyi Li, *Interpolierende verfeinerbare Funktionen für allgemeine Skalierungsmatrizen*, Philipps-Universität Marburg 2017
- Christoph Schwab, *Räume mit reproduzierendem Kern*, Philipps-Universität Marburg 2017
- Cinja Kollmus-Heege, *Numerische Behandlung nichtlinearer Probleme im Rahmen mikrobiologischer Simulationen*, Philipps-Universität Marburg 2017
- Mike Theiß, *Wavelets auf lokal-kompakten Abelschen Gruppen*, Philipps-Universität Marburg 2017
- Anna Kopsch, *Orthogonalitätskriterien für kompakt getragene Skalierungsfunktionen*, Philipps-Universität Marburg 2017
- Stella Joswigs, *Fehlerabschätzungen bei Wavelet-Entwicklungen*, Philipps-Universität Marburg 2017
- Fabian Löttschert, *Stetige Wavelet-Transformation und stetige Multiskalen-Analyse*, Philipps-Universität Marburg 2017
- Christoph Kötzsche, *Zur Theorie und Numerik steifer Systeme*, Philipps-Universität Marburg 2017
- Vania Zhang, *Zur Theorie der Greedy Algorithmen*, Philipps-Universität Marburg 2017

- Sophie Döpp, *Approximationseigenschaften von Multi-Skalierungsfunktionen*, Philipps-Universität Marburg 2017
- Dorian Vogel, *Zur Schrittweitensteuerung bei gewöhnlichen Differentialgleichungen*, Philipps-Universität Marburg 2017
- Melanie Herchenhahn, *Anwendung einer Zeitreihenanalyse zur Umsatzvorhersage einer Beratung, die Dienstleistung auf Stundenbasis in Rechnung stellt*, Philipps-Universität Marburg 2017
- Alexander Michel, *Schrittweitensteuerung bei Mehrschrittverfahren*, Philipps-Universität Marburg 2018
- Ann-Christin Schmidt, *Diagonalisierung von homogenen linearen Operatoren mittels biorthogonaler Wavelet-Basen*, Philipps-Universität Marburg 2018

Current Bachelor Students:

- Philipp Andre Schmidt, *Quadraturformeln für Wavelet-Zerlegungen*
- Lukas Reuter, *Zur Theorie des Compressed Sensing*
- Merve Simsek, *Dualitätsrelationen bei trigonometrischen Wavelets*

Ph.D. Students

Former Ph.D. Students:

- (with P. Maass), Gerd Teschke, *Waveletkonstruktion über Unschärferelationen und Anwendungen in der Signalanalyse*, University of Bremen, 2001
- (with P. Maass), Mathias Lindemann, *Nichtlineare Approximationsmethoden mittels Wavelets und Multiwavelets für allgemeine Skalierungsmatrizen*, University of Bremen, 2005
- Karsten Koch, *Interpolating Scaling Vectors and Multiwavelets in \mathbb{R}^d* , Philipps-University of Marburg, 2006
- Thorsten Raasch, *Adaptive Wavelet and Frame Schemes for Elliptic and Parabolic Equations*, Philipps-University of Marburg, 2007
- Martin Ehler, *The Construction of Nonseparable Wavelet Bi-Frames and Associated Approximation Schemes*, Philipps-Universität Marburg, 2007
- Manuel Werner, *Adaptive Wavelet Frame Domain Decomposition Methods for Elliptic Operator Equations*, Philipps-University of Marburg, 2009
- Jens Kappei, *Adaptive Frame Methods for Nonlinear Elliptic Problems*, Philipps-University of Marburg, 2011

- Petru Cioica, *Besov-Regulartität der Lösungen stochastischer partieller Differentialgleichungen*, Philipps-University of Marburg, 2014
- Ulrich Friedrich, *Adaptive Wavelet Methods for Inverse Problems: Acceleration Strategies, Adaptive Rothe Method and Generalized Tensor Wavelets*, Philipps-University of Marburg, 2015
- Dominik Lellek, *Adaptive Wavelet Frame Schwarz Methods for Nonlinear Elliptic Partial Differential Equations*, Philipps-University of Marburg, 2015
- Stefan Kinzel, *Adaptive Wavelet-Verfahren für stochastische partielle Differentialgleichungen*, Philipps-University of Marburg, 2015
- Frank Eckhardt, *Besov Regularity of Solutions to Navier-Stokes Equations*, Philipps-University of Marburg, 2016
- Haleh Karbalaali, *Channel Edge Detection in 3D Seismic Data Using Shearlet Transforms in Hydrocarbon Resource Exploration*, Amir Kabir University of Technology, Iran, 2018 (Advisory Board: A. Javaherian, S. Dahlke, S. Torabi)
- Christoph Hartmann, *The p -Poisson Equation: Regularity Analysis and Adaptive Wavelet Frame Approximation*, Philipps-University of Marburg, 2018

Current Ph.D. Students:

- Bastian Hackler, *Stetige Shearlet-Transformation auf Sphären*
- Anja Görlich, *Mathematische Modellierung von Proteinlokalisationen in Bakterien*
- Mojdeh Hemmati, *Interpolation Scaling Functions and Wavelets on Bounded Domains*
- Lienhard Pfeifer, *Entwicklung und Optimierung von Algorithmen zur Personenerkennung mittels Shearlets*
- Philipp Keding, *Adaptive Frame Methods based on Quarkonial Decompositions*
- Lukas Sawatzki, *Struktureigenschaften von Shearlet-Coorbit-Räumen*
- Alexander Sieber, *Quarkonial Frames Based on Babushka-Shen Systems*

Grants

- Promotionsstipendium der Universität Bremen, 1986–1989
- Habilitationsstipendium der DFG, 1994–1995
- Member of the DFG Priority Program 1114 “Mathematical Methods of Time Series Analysis and Digital Image Processing”, 2001–2007
- DFG-Project “Multivariate Wavelet Analysis: Constructions, Specific Applications, and Data Structures”, 2001–2003

- DFG–Project “Multivariate Wavelet Analysis II”, 2003–2005
- DFG–Project “Multivariate Wavelet Analysis III”, 2005–2007
- “Wavelets in Banach Spaces”, DAAD Project, 2001
- Member of the TMR Research Network “Harmonic Analysis and Statistics for Signal and Image Processing”, 2002–2006
- DFG–Project “Adaptive Wavelet Methods for Inverse Problems and Inverse Parabolic Equations” (with P. Maass), 2006–2009
- Coordinator of the DFG Priority Program 1324 “Extraction of Quantifiable Information from Complex Systems”, since April 2007
- DFG–Project “Adaptive Wavelet Methods for Stochastic Partial Differential Equations” (with K. Ritter and R. Schilling), 2009–2011
- DFG–Project “Adaptive Frame Methods for Operator Equations: Sparse Grids, Vector-Valued Spaces and Applications to Nonlinear Inverse Problems” (with P. Maass and R. Stevenson), 2008–2011
- DFG–Project “Extraction of Quantifiable Information from Complex Systems”, Coordinator Project, 2008–2011
- Member of the LOEWE-Center “Synthetic Microbiology”, initiated by Philipps-University of Marburg and Max-Planck-Society
- Project: “Sensitivitätsanalyse, Parameterbestimmung und Modellvalidierung für komplexe biologische Prozesse” (with B. Eckhardt and E. Kostina), LOEWE–Center “Synthetic Microbiology”
- Project: “Dynamik regulatorischer Netzwerke für Zellpolarität” (with B. Eckhardt, P. Lenz, and L. Sogaard–Andersen), LOEWE–Center “Synthetic Microbiology”
- DFG–Project “Adaptive Wavelet Methods for Stochastic Partial Differential Equations II” (with K. Ritter and R. Schilling), 2012–2014
- DFG–Project “Adaptive Frame Methods for Operator Equations: Sparse Grids, Vector-Valued Spaces and Applications to Nonlinear Inverse Problems II” (with P. Maass and R. Stevenson), 2011–2013
- DFG–Project “Extraction of Quantifiable Information from Complex Systems”, Coordinator Project, 2011,–2014
- DFG–Project “Optimal Adaptive Finite Element and Wavelet Methods for p –Poisson Equations” (with H. Egger, L. Diening, and M. Fornasier), 2012–2015
- D-A-CH-Project “Adaptive Wavelet and Frame Techniques for Acoustic BEM” (with P. Balazs, H. Harbrecht, and W. Kreuzer), 2013–2016

- DFG–Project “Regularity Theory of Stochastic Partial Differential Equations in (Quasi-) Banach Spaces, 2014–2016.
- D-A-CH-Project “New Function Spaces on Domains and Their Discrete Characterization” (with H. Feichtinger and P. Grohs), 2018–2021

Participant of

- TMR Research Network *Wavelets and Multiscale Methods in Numerical Analysis*
- Vigoni–Programm 1997 – 98, DAAD

Invitations

- University of Potsdam, July 1994, July 1997
- Department of Mathematics, University of South Carolina, October 1994 – Juli 1995
- Université Paris VI Jussieu, November 1995, April 1997
- Mathematisches Forschungsinstitut Oberwolfach, Research in Pairs – Program, December 1996
- TU Chemnitz, December 1997
- C.I.R.M., Luminy, Marseille, August 1998
- Istituto di Analisi Numerica del C.N.R., Pavia, December 1998
- University of Bremen, July, October 1999, January, July, October 2000, September 2003, April 2004, April, August, October 2005, July 2006, March 2007, February 2009, September 2009, April/May 2010
- TU Chemnitz, September 2001
- Philipps–University of Marburg, October 2001
- University of Mannheim, April 2003, March 2009
- University of Jena, April 2003, March 2004, February, August 2005, May 2006, March 2007, October 2007, February 2008, July 2010, May 2014, March 2017, May 2018
- University of Vienna, Special Semester “Modern Methods of Time–Frequency Analysis”, June 2006
- University of Kiel, March 2006
- University of Vienna, April 2005, June 2006, April 2007, August 2008, March 2010, July 2011
- Erwin-Schrödinger-Institut, University of Vienna, December 2006

- TU Dresden, January 2010
- Johann Radon Instiut (RICAM), Linz, March 2010
- FH Neubrandenburg, June 2010, September 2015
- University of Amsterdam, August 2010, January 2011
- University of Aalborg, June 2012
- TU Kaiserslautern, June 2013, August 2014
- Acoustic Research Institute, Vienna, August 2013, July 2014, May 2016
- University of Genova, September 2013
- University of Basel, November 2013, April 2015
- University of Genova, April 2014, February 2015, June 2015, June 2017
- C.I.R.M., Luminy, Marseille, September 2014, April 2015
- University of Ulm, July 2015
- University of Osnabrück, February 2016
- Hausdorff Research Institute for Mathematics, Bonn, Special Trimester “Mathematics of Signal Processing”, March 2016
- RWTH Aachen, May 2016
- Invitation to: ESI Programme on “Tractability of High Dimensional Problems and Discrepancy”, Erwin Schrödinger Institute, Vienna, October 2017

Conferences

Organized Conferences:

- Mini-Symposion “Multiskalenmethoden, Integralgleichungen und inverse Probleme” (with W. Dahmen), RWTH Aachen, 7. – 8. March 1994
- Workshop “Wavelet Transforms on Spheres” (with P. Maass), University of Potsdam, 22. – 26. January 1996
- (with M. Hanke–Bourgeois, P. Kloeden, J. Lang, V. Michel, K. Ritter, and G. Steidl), Rhein-Main Arbeitskreis “Mathematics of Computation”, SS 03, WS 03/04, SS 04, WS 04/05, SS 05, WS 05/06, SS 06, WS 06/07, SS 07, WS 07/08, SS 08, WS 08/09, SS 09, WS 09/10, SS 10, WS 10/11, SS 11, WS 11/12, SS 12
- Workshop “Recent Progress in Wavelet Analysis and Frame Theory” (with P. Maass), University of Bremen, 23. – 26. January 2006

- “Algorithms and Complexity for Continuous Problems” (with J. Traub, I. Sloan, and K. Ritter), Schloss Dagstuhl - Wadern, 26. – 29. September 2006
- Workshop “Nichtlineare Approximationsverfahren” (with K. Ritter), TU Darmstadt, 29. – 30. June 2007
- Workshop “Adaptive Numerical Methods for Inverse Problems” (with P. Maass and G. Teschke), University of Bremen, 27. – 29. August 2007
- “Structured Decompositions and Efficient Algorithms” (with I. Daubechies, M. Elad, G. Kutyniok, and G. Teschke), Schloss Dagstuhl - Wadern, 30. November – 05. December 2008
- “Tag des Wissenschaftlichen Rechnens”, (with E. Kostina und U. Friedrich, Philipps-University Marburg, 23. January 2009
- “SPDEs 09: Modelling, Analysis, and Approximation” (with S. Larsson, K. Ritter, R. Schilling, W. Stannat, and J. Zabczyk), TU Darmstadt, 24. – 28. August 2009
- Workshop “Nonlinear and Adaptive Approximation”, A workshop in honor of Wolfgang Dahmen on the occasion of his 60th birthday, (with R. Hochmuth, A. Kunoth, S. Müller, and K. Urban), 30. September. – 3. October 2009.
- “Nonlinear Approximation”, (with U. Friedrich and S. Kinzel), Philipps–University of Marburg, 27. – 28. May 2010
- “Sparse Representation and Efficient Sensing of Data”, (with M. Elad, Y. Elder, G. Kutyniok, and G. Teschke), Schloss Dagstuhl - Wadern, February 2011
- “A Computational Approach to Harmonic Analysis” (with H. Feichtinger, U. Friedrich, D. Onchis, and T. Raasch), Philipps–University of Marburg, 22. – 26. August 2011
- Colloquium on the occasion of the 60th. birthday of Prof. Dr. P. Oswald, (with G. Pfander and P. Zheltov), Bremen, 24. November 2011
- “Mathematical Modeling of Microbiological Systems” (with B. Eckhardt, A. Herzog, E. Kostina, P. Lenz, and P. Rashkov), Philipps-University of Marburg, 1. – 5. July 2012
- “Applied Coorbit Theory” (with H. Feichtinger), Erwin Schrödinger Institut, Vienna, 17. – 22. September 2012
- “Wavelets in Scientific Computing” (with M. Fornasier), Erwin Schrödinger Institut, Wien, 12. – 17. November 2012
- 18th. ÖMG Congress and Annual DMV Meeting, University of Innsbruck, 23. – 27. September 2013, Section “Functional Analysis, Real and Complex Analysis”, (with Hans Feichtinger)

- Final Meeting of the DFG Priority Program 1324 “Extraction of Quantifiable Information from Complex Systems”, Marburg, 24. – 28. November 2014 (with Frank Eckhardt)
- Oberwolfach–Workshop “New Discretization Methods for the Numerical Approximation of PDEs”, (with G. Kutyniok, R. Stevenson, and E. Süli), 11. – 17. January 2015
- Oberwolfach–Workshop “Innovative Approaches to the Numerical Approximation of PDEs”, (with G. Kutyniok, R. Nocketto, and R. Stevenson), 1. – 7. September 2019

Plenary Talks:

- “Fourth Conference on Discrete Mathematics”, Potsdam, 27. September – 1. October 1993
- “Wavelet–Approximation und Anwendungen”, Lübeck, 25. – 27. May 1995
- “Spectral Methods in Medical Signal Processing”, München, 25. – 28. February 1998
- DMV–Annual Meeting, Section “Numerische Mathematik/Wissenschaftliches Rechnen/Industriemathematik”, Dresden, 18. – 22. September 2000
- Symposium on “Managing and Analyzing Data Streams: Towards Unifying Approaches from Mathematical Statistics and Computer Sciences”, Philipps–University of Marburg, 13. – 15. June 2002.
- “Sechste Internationale Konferenz über Multivariate Approximation”, Haus Bommerholz, 25. September – 1. Oktober 2005
- Invitation to: “Mathematical Methods in Engineering”, University of Ankara, 27. – 29. April 2006
- “Multiscale Methods, Sparse Decompositions and Parsimonious Statistics (HASSIP 06)”, GSF-IBB, Neuherberg München, 11. – 14. September 2006.
- “8th International Conference on Function Spaces, Differential Operators, and Non-linear Analysis (FSDONA 2011)”, Trabarz, 16. – 24. September 2011
- “Geomathematics 2013”, St. Martin, Germany, 12. – 15. April 2013
- “Approximation Methods and Function Spaces”, Hasenwinkel, Germany, 16. – 20. March, 2015
- “Aspects of Time–Frequency Analysis”, Torino, Italy, 5. – 7. June, 2017
- “Geomathematics Meets Medical Imaging”, Speyer, Germany, 5. – 8. September 2017
- Invitation to “Approximation Methods and Fast Algorithms” Hasenwinkel, Germany, 10. – 14. September 2018
- more than 20 invitations to Oberwolfach conferences

- six invitations to Schloss-Dagstuhl conferences

Invited Talks:

- “Wavelets (Signalverarbeitung)”, Mathematisches Forschungsinstitut Oberwolfach, 3. – 9. May 1992
- “Algebraische Methoden in der Numerischen Mathematik”, Potsdam, 20. August 1993
- “Wavelets (Signalverarbeitung)”, Mathematisches Forschungsinstitut Oberwolfach, 6. – 12. August 1995
- “Wavelets and Applications”, Domaine du Rond–Chene, Esneux(Liege), 11. – 12. October 1996
- Foundations of Computational Mathematics, Minisymposium “Approximation and Partial Differential Equations”, Rio de Janeiro, Brazil, 5. – 12. January 1997
- “Numerische Methoden in der Approximationstheorie”, Mathematisches Forschungsinstitut Oberwolfach, 11. – 17. May 1997
- Seminar über “Partielle Differentialgleichungen”, RWTH Aachen, 25. – 26. June 1997
- “Mathematische Methoden in der Geodäsie”, Mathematisches Forschungsinstitut Oberwolfach, 28. March – 3. April 1999
- FoCM–Workshop “Multiresolution and Adaptivity in Numerical Solution of PDEs”, Minneapolis, 5. – 14. August 2002
- “Algorithms and Complexity for Continuous Problems”, Seminar 02401, Schloss Dagstuhl - Wadern, 29. September – 4. October 2002
- Workshop “Wavelets and their Generalizations”, Aalborg University, Denmark, 15. – 16. August 2003
- Workshop “Wavelets and Applications”, Domaine du Rond–Chene, Esneux(Liege), 9. – 10. September 2003
- “Geomathematik”, Mathematisches Forschungsinstitut Oberwolfach, 23. – 29. May 2004
- “Algorithms and Complexity for Continuous Problems”, Seminar 04401, Schloss Dagstuhl - Wadern, 26. September – 1. October 2004
- Workshop on “Sparsity and Applications”, Radon Institute for Computational and Applied Mathematics, University of Linz, 21. June 2006
- DMV Annual Meeting 2007, Minisymposium “Konvergenz adaptiver Diskretisierungsverfahren”, Humboldt–University of Berlin, 25. – 30. March 2007

- “Wavelet and Multiscale Methods”, Mathematisches Forschungsinstitut Oberwolfach, 29. Juli – 4. August 2007
- Workshop “Geomathematics”, TU Kaiserslautern, 2. – 4. July 2008
- “Algorithms and Complexity for Continuous Problems”, Seminar 09391, Schloss Dagstuhl - Wadern, 20. – 25. September 2009
- Workshop “Sparsity and Computation”, Hausdorff Center for Mathematics, Bonn, 7. – 11. June 2010
- “New Trends in Harmonic and Complex Analysis”, Jacobs University of Bremen, 29. June – 3. July 2010
- Mini-Workshop “Shearlets”, Mathematisches Forschungsinstitut Oberwolfach, 3. – 9. October 2010
- “From Abstract to Computational Harmonic Analysis”, Strobl, Austria, 13. – 19. June 2011
- Foundations of Computational Mathematics, Workshop “Information Based Complexity”, Budapest, 4. – 6. July 2011
- Workshop “High-Dimensional Aspects of Stochastic PDEs”, Hausdorff Research Institute, Bonn, 8. – 12. August 2011
- Workshop “Numerical Analysis of Multiscale Problems & Stochastic Modelling, RICAM, Linz, 12. – 16. December 2011
- Workshop on “Computational Stochastics”, Annweiler, 25. – 30. March 2012
- Workshop “Applied Harmonic Analysis and Sparse Approximation”, Mathematisches Forschungszentrum Oberwolfach, 10. – 16. June 2012
- 29.th. European Meeting of Statisticians, Budapest, Hungary, 25. – 25. July 2013, Session on “Approximation Numerical Approximation of SPDEs
- Workshop “Multiscale and High-Dimensional Problems”, Mathematisches Forschungszentrum Oberwolfach, 28. July – 3. August 2013
- ESI-Workshop “Time-Frequency-Analysis”, Erwin Schrödinger Institute for Mathematical Physics, Vienna, 13. – 17. January 2014.
- Mid-Term Workshop “BIOTOP: Adaptive Wavelet and Frame Techniques for Acoustic BEM”, Traunkirchen, 19. – 21. August 2014
- “Information Bases Complexity”, Bedlewo, Poland, 26. April – 2. May 2015
- Workshop on “Harmonic Analysis, Graphs and Learning”, Hausdorff Research Institute for Mathematics, 14. – 18. March 2016

- International Conference on “Multivariate Approximation”, Schloss Rauischholzhausen, 31. March – 5. April, 2016
- IBC on the 70th Anniversary of Henryk Wozniakowski, Bedlewo, Poland, 28. August – 2. September 2016
- Mini-Workshop “Adaptive Methods for Control Problems Constrained by Time-Dependent PDEs”, Mathematisches Forschungszentrum Oberwolfach, 08. – 14. January 2017
- “Foundations of Computational Mathematics”, Section “Multiresolution and Adaptivity in Numerical PDEs”, Barcelona, 10. – 19. July 2017
- “Tractability of High Dimensional Problems”, Erwin Schrödinger International Institute for Mathematics and Physics, Vienna, 09. – 13. October 2017.

Contributed Talks:

- “12. Norddeutsches Kolloquium über Angewandte Analysis und Numerik”, Rostock, 24. – 25. May 1991
- “DMV Annual Meeting”, Berlin, 13. – 18. September 1992
- “Curves and Surfaces”, Chamonix-Mont-Blanc, France, 10. – 16. June 1993
- “International Conference on Wavelets”, Taormina, Sicily, Italy, 14. – 20. October 1993
- “Eighth International Conference on Approximation Theory”, College Station, Texas, USA, 8. – 12. January 1995
- “The 899th Meeting of the AMS”, Orlando, Florida, 17. – 18. March 1995
- Workshop “Multiscale Methods in Numerical Analysis”, Laboratoire ASCI-IDRIS, Orsay, Paris, 13. – 15. March 1996
- Workshop “Wavelet Transforms on Spheres”, Potsdam, 22. – 26. January 1996
- Workshop “Wavelets and Multiscale Methods in Numerical Analysis”, Pavia, Italy, 4. – 6. September 1997
- “Wavelets and Multiscale Methods”, Tanger, Morocco, 13. – 17. April 1998
- “International Conference on Multivariate Approximation”, Haus Bommerholz, 28. September – 2. October 1998
- “2. Workshop Orthogonale Polynome”, Ballenstedt, 23. – 26. April 1999
- GAMM-Workshop “Adaptive Methods – Error Estimators”, Kiel, 21. – 23. January 2000

- 2001 International Conference “Preconditioned Robust Iterative Solution Methods for Problems with Singularities”, Nijmegen, 21. – 23. May 2001
- The 5th International Conference “Function Spaces, Differential Operators, and Non-linear Analysis”, Teistungen, 28. June – 4. July 2001
- 20th IFIP TC7 Conference on “System Modelling and Optimization”, Trier, 23. – 27. July 2001
- “2nd International Gabor Workshop in Vienna”, 3. – 7. December 2001
- “HASSIP kickoff meeting”, Marseilles, 14. – 16. November 2002
- “SampTA03”, Strobl, Österreich, 26. – 30. May 2003
- Mecklenburger Workshop “Approximationsmethoden und schnelle Algorithmen”, Hasenwinkel 4. – 6. July 2003
- International Conference “Modern Methods of Time–Frequency Analysis”, Strobl, 23. – 28. May 2005
- International Conference “Trends in Harmonic Analysis”, Strobl, 18. – 22. June 2007
- Workshop on “Function Spaces and Applications”, Freyburg/Unstrut, 6. – 12. July 2008
- “Strobl 09 Conference on Time–Frequency Analysis”, Strobl, 15. – 20. June 2009
- Workshop on “Compressed Sensing, Sparsity, and Inverse Problems”, TU Braunschweig, 6- – 7. September 2010
- International Workshop on “Smoothness, Approximation, and Function Spaces”, Oppurg, Thüringen, 10. – 16. October 2010
- 1. International Workshop on “Compressed Sensing Applied to Radar”, University of Bonn, 14. – 16. May 2012
- International Conference “Modern Time–Frequency Analysis”, Strobl, 2. – 6. June 2014
- International Conference “Time–Frequency Analysis and related Topics”, Strobl, 6. – 10. June 2016
- “New Perspectives in the Theory of Function Spaces and their Applications”, Bedlewo, 17. – 23. September 2017

Talks at Colloquia

- GKSS Forschungszentrum Geesthacht, 10. November 1992

- University of Göttingen, 10. May 1994
- Université Paris VI Jussieu, Paris, 10. November 1995
- RWTH Aachen, 12. December 1995
- University of Kaiserslautern, 2. July 1996
- University of Erlangen, 10. September 1997
- University of Erlangen, 12. February 1998
- University of Magdeburg, 7. July 1998
- C.I.R.M., Luminy, Marseille, 12. August 1998
- University of Kaiserslautern, 5. January 1999
- FH Aachen, 12. April 1999
- University of Bayreuth, 13. July 1999
- University of Bremen, 27. October 1999
- University of Jena, 15. November 1999
- Université de Mons–Hainaut, Belgien, 27. March 2000
- University of Cambridge, 2. May 2000
- Technical University of Graz, 12. May 2000
- University of Dortmund, 22. Mai 2000
- Lund University, Schweden, 15. June 2000
- University of Bremen, 5. Juli 2000
- University of Marburg, 8. November 2000
- University of Innsbruck, 11. January 2001
- University of Bremen, 23. January 2001
- International University of Bremen, 5. April 2001
- University of Potsdam, 4. May 2001
- Medical University of Lübeck, 9. July 2001
- University of Siegen, 7. May 2002
- University of Jena, 2. April 2003
- University of Marburg, 4. June 2003

- GSF Neuherberg, München, 13. June 2003
- University of Frankfurt, 11. July 2003
- University of Duisburg, 21. January 2004
- TU Ilmenau, 7. May 2004
- University of Jena, 19. May 2006
- University of Vienna, 19. June 2006
- International University of Bremen, 4. December 2006
- Erwin-Schrödinger-Institut, University of Vienna, 13. December 2006
- TU Dresden, 20. January 2010
- Johann Radon Institut (RICAM), Linz, 17. March 2010
- Acoustics Research Institute, Austrian Academy of Sciences, Vienna, 22. March 2010
- TU Kaiserslautern, 10. September 2010
- University of Vienna, 15. November 2010
- University of Göttingen, 9. January 2012
- TU München, 25. January 2012
- University of Aalborg, 28. June 2012
- TU Berlin, 10. July 2012
- University of Frankfurt, 27. November 2013
- University of Jena, 19. May 2014
- University of Genova, 24. February 2015
- Katholische Universität Eichstätt, 28. June 2017
- University of Jena, 4. May 2018
- University of Erlangen, 22. May 2018

Editorial Work

- Associate Editor *Journal of Complexity*
- Associate Editor *Journal of Fourier Analysis and Applications*
- Associate Editor *GEM – International Journal of Geomathematics*

- Guest Editor, Special Issue on *Wavelet and Fractal Methods in Science and Engineering*, Arabian Journal for Science and Engineering
- Guest Editor, Special Issue on *Analysis on the Sphere*, Journal of Fourier Analysis and Applications
- Guest Editor, *Special Issue on the Occasion of Wolfgang Dahmen's 60th Birthday*, Journal of Fourier Analysis and Applications
- Editor of the Book "Extraction of Quantifiable Information from Complex Systems", Lecture Notes in Computational Science and Engineering **102**, Springer, 2014
- Editor of the Book "Harmonic and Applied Analysis: From Groups to Signals", Birkhäuser Series Applied and Numerical Harmonic Analysis, Birkhäuser, 2014

Activity as Referee

Journals:

Acta Mathematica, Advances in Computational Mathematics, ANZIAMT (The Australian & New Zealand Industrial and Applied Mathematics Journal), Applied and Computational Harmonic Analysis, Applied Mathematics Journal of the Australian Math. Soc., Applied Mathematics Letters, Arabian Journal of Science and Engineering, Central European Journal of Mathematics, Constructive Approximation, Electronic Transactions of Numerical Analysis, Foundations of Computational Mathematics, IMA Journal of Numerical Analysis, International Journal of Wavelets, Multiresolution and Information Processing, Journal of Approximation Theory, Journal of Complexity, Journal of Computational Physics, Journal of Mathematical Imaging and Vision, Journal of Mathematical Physics, Journal of Wavelet Theory and Applications (JWTA), Linear Algebra and its Applications, Mathematics of Computation, Mathematics of Control, Signals, and Systems, Numerical Functional Analysis and Optimization, Numerical Methods for Partial Differential Equations, Proceedings of the Royal Society, Rocky Mountain Journal of Mathematics, SIAM Journal on Numerical Analysis, Transactions of the American Mathematical Society, ZAMM, Computing and Visualization in Science, Contemporary Mathematics, Journal of Mathematical Analysis and Applications, Journal of Fourier Analysis and Applications, Stochastic Analysis and Applications, IEEE Signal Processing Letters, IEEE Transactions on Signal Processing, IEEE Transactions on Image Processing, Zeitschrift für Analysis und Anwendungen, Journal of Contemporary Mathematical Analysis, Applied Numerical Mathematics, Mathematische Nachrichten, many times for Proceedings

Further Activities:

- Referee for Fond zur Förderung der wissenschaftlichen Forschung, Austria
- Referee for Deutsche Forschungsgemeinschaft (DFG)

- Referee for Dutch National Science Foundation (NWO)
- Referee for German Academic Exchange Service (DAAD)
- Referee for Alexander von Humboldt Foundation
- Referee for Austrian Academy of Sciences
- 2. Referee for eleven Ph.D.-Theses
- 2. Referee for two Habilitation Theses

Current Collaborations

University of Bremen, ZeTeM:	Prof. Dr. Peter Maass
ZIB, Berlin/FH Neubrandenburg: :	Prof. Dr. Gerd Teschke
University of Jena:	Prof. Dr. Erich Novak, Prof. Dr. Winfried Sickel
University of Amsterdam:	Prof. Dr. Rob Stevenson
TU Berlin:	Prof. Dr. Gitta Kutyniok
University of Vienna:	Prof. Dr. Karlheinz Gröchenig, Prof. Dr. Hans Feichtinger
TU Dresden:	Prof. Dr. Rene Schilling
TU Kaiserslautern:	Prof. Dr. Klaus Ritter, Prof. Dr. Gabi Steidl
TU München:	Prof. Dr. Massimo Fornasier
University of Mainz:	Prof. Dr. Thorsten Raasch
Jacobs Universtiy of Bremen:	Prof. Dr. Peter Oswald
FH Aschaffenburg:	Prof. Dr. Hans-Georg Stark
University of Genova	Prof. Dr. Filippo De Mari, Dr. Ernesto De Vito
ARI Vienna:	HD. Dr. Peter Balasz, Dr. Wolfgang Kreuzer
University of Basel:	Prof. Dr. Helmuth Harbrecht
University of Bielefeld:	Prof. Dr. Lars Dienenig
University of Manitoba:	Prof. Dr. Shiu Hong Lui
Ruhr-Universität Bochum:	Junior-Prof. Dr. Markus Weimar

Miscellaneous

- March 2011: Offer of a Full Professorship (W3) for Mathematical Biology, TU Kaiserslautern, declined
- Coordinator of the DFG Priority Program 1324 “Extraction of quantifiable information from complex systems”

- Member of the “Beirat für Forschung”, Philipps-University of Marburg
- Member of the Steering Committee of the LOEWE–Center for “Synthetic Microbiology”, 2010–2014
- Member of the Advisory Board of the EU-Project UNLOCX : “Uncertainty principles versus localization properties, function systems for efficient coding schemes”, 2010–2013
- Member of the “Fakultätsbeirat der Fakultät für Mathematik und Informatik”, Friedrich–Schiller–Universität Jena
- Member of the Scientific Committee for the International Conference “New perspectives in the theory of function spaces and their applications”, Bedlewo, September 2017