

Friedrich Philipp

Curriculum Vitae

Contact and Personal Data

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Employment History

since 04/2016 Postdoctoral research fellow, Universidad de Buenos Aires
Oct 2013 – Mar 2016 Postdoctoral research fellow, TU Berlin
Oct 2012 – Sep 2013 Visiting Professor, TU Clausthal, Germany
Apr 2012 – Sep 2012 Research position at MATHEON, Berlin
Jan 2012 – Mar 2012 Postdoctoral research fellow, TU Berlin
Oct 2011 – Dec 2011 Postdoctoral research fellow, TU Ilmenau
Feb 2011 Dr. rer. nat. (Ph.D.) in Mathematics, TU Berlin
Oct 2010 – Sep 2011 Research fellow, TU Berlin
Oct 2009 – Sep 2010 Research fellow, TU Ilmenau
Oct 2008 – Sep 2009 Ph.D. fellowship by Carl-Zeiss-Stiftung, TU Ilmenau
Oct 2006 – Sep 2008 Research fellow, TU Berlin

Educational Background

Oct 2001 – Sep 2006 Studies in Mathematics, TU Berlin
Sep 2000 – Aug 2001 Exchange year, DTU Copenhagen
Oct 1997 – Aug 2000 Studies in Mathematics, Uni Hamburg

Invited Research Visits

2016 Technische Universität Ilmenau, 1 week
2012 University of Missouri, 1 month
2011 Technische Universität Graz, 1 week
2010 Voronezh State University, 2 weeks
2009 Vrije Universiteit Amsterdam, 1 week
Jagiellonian University Krakow, 1 month

Invited Talks

- Jul 2017 Sampling Theory and Applications (SampTA 2017), Tallinn, Estonia
- Dec 2016 Operator Theory and Indefinite Inner Product Spaces (OTIND 2016), Vienna, Austria
- Nov 2016 Invited colloquium talk, Universidad Nacional de La Plata, Argentina
- Sep 2016 Tercera Escuela sobre Análisis Funcional y Geometría, Instituto Argentino de Matemática, Buenos Aires, Argentina
- Jul 2016 International Workshop on Operator Theory and Applications (IWOTA 2016), Saint Louis, USA
- Jan 2016 Invited colloquium talk, TU Ilmenau, Germany
- Aug 2015 SPIE Annual Meeting, San Diego, USA
- Mar 2014 85th Annual Meeting of the GAMM, Erlangen, Germany
- Jan 2014 Rhein-Ruhr-Workshop, Bestwig, Germany
- Aug 2013 SPIE Annual meeting, San Diego, USA
- Mar 2013 84th Annual Meeting of the GAMM, Novi Sad, Serbia
- Jan 2013 Workshop “Spectral and Perturbation Theory of Selfadjoint Operators in Krein Spaces”, Graz, Austria
- Dec 2012 MATHEON Workshop “Sparse Representation of Functions: Analytic and Computational Aspects”, Berlin, Germany
- Sep 2012 DMV-Jahrestagung, Saarbrücken, Germany
- Sep 2012 Advances in Mathematical Image Processing, Göttingen, Germany
- Aug 2012 Spectral Theory and Differential Operators, Graz, Austria
- Jul 2012 Analysis-Seminar, TU Chemnitz, Germany
- Jun 2012 Oberwolfach-Workshop “Applied Harmonic Analysis and Sparse Approximation”, Oberwolfach, Germany
- Apr 2012 83rd Annual Meeting of the GAMM, Darmstadt, Germany
- Mar 2012 Analysis Seminar, University of Missouri, USA
- Mar 2012 Seminar, University of Missouri, USA
- Sep 2011 DMV-Jahrestagung, Köln, Germany
- Jun 2011 Workshop on Analytic and Computational Techniques in Spectral Theory and Related Topics, Gregynog, Wales
- May 2011 Operator Theory and Boundary Value Problems, Orsay, France
- Oct 2010 KROMSH 2010, Simferopol, Ukraine
- Jul 2010 International Workshop on Operator Theory and Applications (IWOTA 2010), Berlin, Germany
- Jun 2010 Functions and Operators (FaO 2010), Krakow, Poland
- Sep 2009 International Workshop on Operator Theory and Applications (IWOTA 2009), Guanajuato, Mexico
- Feb 2009 80th Annual Meeting of the GAMM, Gdansk, Poland
- Dec 2008 8th Workshop Operator Theory in Krein Spaces and Inverse Problems, Berlin, Germany
- Jul 2008 International Workshop on Operator Theory and Applications (IWOTA 2008), Williamsburg, USA

- Mar 2007 Modern Analysis and Applications, Odessa, Ukraine
 Sep 2006 Studentenkonferenz der DMV, Bonn, Germany
 Aug 2005 5th Workshop Operator Theory in Krein Spaces and Differential Equations, Berlin, Germany

List of Publications

Journal Publications

- [22] Finite rank perturbations in Pontryagin spaces and a Sturm-Liouville problem with λ -rational boundary conditions (joint with J. Behrndt), Preprint.
- [21] Bessel orbits of normal operators, to appear in *J. Math. Anal. Appl.*
- [20] The effect of perturbations of linear operators on their polar decomposition (joint with R. Duong), to appear in *Proc. Amer. Math. Soc.*
- [19] The effect of perturbations of operator-valued frame sequences and fusion frames on their duals (joint with G. Kutyniok and V. Paternostro), to appear in *Oper. Matrices*.
- [18] Measures of scalability (joint with X. Chen, G. Kutyniok, K.A. Okoudjou, and R. Wang), *IEEE Trans. Inf. Theory* 61, 4410–4423 (2015).
- [17] Spectral points of type π_+ and type π_- of closed operators in indefinite inner product spaces (joint with C. Trunk), *Oper. Matrices.* 9, 481–506 (2015).
- [16] Estimates on the non-real eigenvalues of regular indefinite Sturm-Liouville problems (joint with J. Behrndt, S. Chen, and S. Qi), *Proc. Roy. Soc. Edinburgh Sect. A* 144, 1113–1126 (2014).
- [15] Bounds on the non-real spectrum of differential operators with indefinite weights (joint with J. Behrndt and C. Trunk), *Math. Ann.* 357, 185–213 (2013).
- [14] Indefinite Sturm-Liouville operators with periodic coefficients, *Oper. Matrices.* 7, 777–811 (2013).
- [13] Variation of discrete spectra of non-negative operators in Krein spaces (joint with J. Behrndt and L. Leben), *J. Oper. Theory.* 71, 157–173 (2014).
- [12] Scalable frames and convex geometry (joint with G. Kutyniok and K.A. Okoudjou), *Contemp. Math.* 626, 19–32 (2014).
- [11] The numerical range of non-negative operators in Krein spaces (joint with C. Trunk), *Linear Algebra Appl.* 438, 2542–2556 (2013).
- [10] Scalable frames (joint with G. Kutyniok, K.A. Okoudjou, and E.K. Tuley), *Linear Algebra Appl.* 438, 2225–2238 (2013).
- [9] Local spectral theory for normal operators in Krein spaces (joint with V. Strauss and C. Trunk), *Math. Nachr.* 286, 42–58 (2013).
- [8] Spectral functions of products of selfadjoint operators (joint with T.Ya. Azizov and M. Denisov), *Math. Nachr.* 285, 1711–1728 (2012).
- [7] Locally definite normal operators in Krein spaces, *J. Func. Anal.* 262, 4929–4947 (2012).

- [6] Local definitizability of $T^{[*]}T$ and $TT^{[*]}$ (joint with A.C.M. Ran and M. Wojtylak), *Integral Equ. Oper. Theory* 71, 491–508 (2011).
- [5] Selfadjoint operators in S-spaces (joint with F.H. Szafraniec and C. Trunk), *J. Funct. Anal.* 260, 1045–1059 (2011).
- [4] Spectral analysis of singular ordinary differential operators with indefinite weights (joint with J. Behrndt), *J. Differ. Equations* 248, 1899–2198 (2010).
- [3] G-selfadjoint operators in Almost Pontryagin spaces (joint with C. Trunk), *Oper. Theory: Adv. Appl.* 188, 207–235 (2008).
- [2] On domains of powers of linear operators and finite rank perturbations (joint with T.Ya. Azizov, J. Behrndt, and C. Trunk), *Oper. Theory: Adv. Appl.* 188, 31–37 (2008).
- [1] Properties of the spectrum of type π_+ and type π_- of self-adjoint operators in Krein spaces (joint with J. Behrndt and C. Trunk), *Methods Funct. Anal. Topology* 12, 326–340 (2006).

Refereed Conference Proceedings

- [9] Perturbations of fusion frames and the effect on their duals (joint with G. Kutyniok and V. Paternostro), *Proc. SPIE* 9597, Wavelets and Sparsity XVI, 95970S; doi:10.1117/12.2187063
- [8] Phase retrieval from 4N-4 measurements: A proof of injectivity, *Proc. Appl. Math. Mech.* 14, 833–834 (2014).
- [7] Signal recovery from thresholded frame measurements (joint with H. Boche, M. Guillemard, and G. Kutyniok), *Proc. SPIE* 8858, Wavelets and Sparsity XV, 88580D (September 26, 2013); doi:10.1117/12.2022793.
- [6] Preconditioning of frames (joint with G. Kutyniok and K.A. Okoudjou), *Proc. SPIE* 8858, Wavelets and Sparsity XV, 88580G (September 26, 2013); doi:10.1117/12.2022667.
- [5] Bounds on the non-real eigenvalues of indefinite Sturm-Liouville problems (joint with J. Behrndt, S. Chen, and J. Qi), *Proc. Appl. Math. Mech.* 13, 525–526 (2013).
- [4] Signal analysis with frame theory and persistent homology (joint with H. Boche, M. Guillemard, and G. Kutyniok), 10th International Conference on Sampling Theory and Applications (SampTA 13, Bremen, Germany, 2013), 309–331, Eurasip, 2013.
- [3] Perfect preconditioning of frames by a diagonal operator (joint with G. Kutyniok and Kasso A. Okoudjou), 10th International Conference on Sampling Theory and Applications (SampTA 13, Bremen, Germany, 2013), 85–88, Eurasip, 2013.
- [2] Definitizability of a class of J-selfadjoint operators with applications (joint with J. Behrndt and C. Trunk), *Proc. Appl. Math. Mech.* 9, 665–666 (2009).
- [1] Definizable products of selfadjoint operators (joint with T.Ya. Azizov and M.Denisov), *Proc. Appl. Math. Mech.* 12, 769–770 (2012).

Book Chapters

- [2] Introduction to Finite Frame Theory (joint with P.G. Casazza and G. Kutyniok), in: *Finite Frames: Theory and Applications*, Birkhäuser Boston, 2012.
- [1] Information Extracting Sensor Networks (joint with M. Guillemard and G. Kutyniok), in: *MATHEON – Mathematics for Key Technologies*, EMS Publishing House, Zürich, 2014.

Other Publications

- [3] Phase retrieval from 4N-4 measurements, arXiv:1403.4769v1.
- [2] Eigenvalues in gaps of selfadjoint operators in Pontryagin spaces, arXiv:1111.3011v1.
- [1] Scalable frames, Oberwolfach Report 29/2012, DOI: 10.4171/OWR/2012/29.

Referee Work

Referee for the Following Journals

- Analysis Mathematica
Bulletin of the Iranian Mathematical Society
Bulletin of the Malaysian Mathematical Sciences Society
IEEE Signal Processing Letters
International Journal of Wavelets, Multiresolution and Information Processing
Journal of Approximation Theory
Journal of Fourier Analysis and Applications
Journal of Mathematical Analysis and Applications
Journal of Numerical Mathematics
Journal of Spectral Theory
Linear Algebra and its Applications
Mathematische Nachrichten
Mathematische Annalen
Methods of Functional Analysis and Topology
Operators and Matrices
Rendiconti del Circolo Matematico di Palermo
Waves, Wavelets and Fractals

Referee for the Following Conference Proceedings

- IEEE International Symposium on Information Theory
Proceedings of SPIE
Proceedings of SAMPTA

Referee for Bachelor and Master Theses

- 2016 Richard Duong (Bachelor thesis, TU Berlin)
- 2015 Hendrik Bernd Petersen (Bachelor thesis, TU Berlin)
- 2014 Ché Netzer (Master thesis, TU Berlin)
- 2013 Ché Netzer (Bachelor thesis, TU Berlin)

Robert Fulsche (Bachelor thesis, TU Clausthal)

Raising Funds

Deutsche Forschungsgemeinschaft (DFG)

- 2013 "Unterstützung zum Aufbau intern. Kooperationen" (9000 EUR)
- 2015 Conference trip to Williamsburg, USA (2000 EUR)

Deutscher akademischer Austauschdienst (DAAD)

- 2015 Conference trip to San Diego, USA (2000 EUR)
- 2013 Conference trip to San Diego, USA (2000 EUR)
- 2012 Conference trip to Graz, Österreich (700 EUR)
- 2010 Research stay in Voronezh, Russia (1000 EUR)
- 2009 Conference trip to Guanajuato, Mexiko (1400 EUR)

Organization of Events

- 2015 Local organizer of MATHEON conference CSA 2015, TU Berlin
- 2014 Organizer of Section "Applied Operator Theory" of GAMM meeting
- 2013 Local organizer of MATHEON conference CSA 2013, TU Berlin

Teaching Record

Supervised Students

- Apr 2016 – Dec 2016 Ingo Gühring, Bachelor, TU Berlin
- Oct 2015 – Apr 2016 Richard Duong, Bachelor, TU Berlin
- Apr 2015 – Oct 2015 Klara Schmitt, Bachelor, FU Berlin
- Mar 2015 – Sep 2016 Lara Hoffmann, Bachelor, TU Berlin
 - since Oct 2014 Matthias Möser, Bachelor, TU Berlin
- Apr 2014 – Mar 2015 Hendrik Bernd Petersen, Bachelor, TU Berlin
- Nov 2013 – Jul 2014 Ché Netzer, Master, TU Berlin
- Sep 2013 – Jan 2014 Julian Reisch, Bachelor, FU Berlin
- Jan 2013 – Jul 2013 Ché Netzer, Bachelor (Award at Dies Mathematicus, TU Berlin)
- Oct 2010 – Sep 2011 Leslie Leben, Diplom (Award at Dies Mathematicus, TU Berlin)

Lectures

- Winter Term 15/16 Introduction to Frame Theory, TU Berlin
- Summer Term 15 Functional Analysis I, TU Berlin
- Winter Term 14/15 Functional Analysis II, TU Berlin
- Winter Term 13/14 Analysis I for Engineers, TU Berlin
- Summer Term 13 Mathematics for Engineers II, TU Clausthal
- Summer Term 13 Functional Analysis, TU Clausthal
- Winter Term 12/13 Mathematics for Engineers I, TU Clausthal

Exercise Classes

- Summer Term 15 Functional Analysis I, TU Berlin
- Winter Term 14/15 Functional Analysis II, TU Berlin
- Summer Term 14 Linear Algebra for Engineers, TU Berlin
- Summer Term 12 Functional Analysis I, TU Berlin
- Winter Term 11/12 Differential Equations, TU Ilmenau
- Winter Term 11/12 Analysis I, TU Ilmenau
- Winter Term 11/12 Measure Theory, TU Ilmenau
- Summer Term 08 Mathematics for Physicists IV, TU Berlin
- Winter Term 07/08 Functional Analysis II, TU Berlin
- Summer Term 07 Functional Analysis I, TU Berlin
- Winter Term 06/07 Functional Analysis II, TU Berlin

Seminars

- Winter Term 12/13 Differential Equations, TU Clausthal
- Winter Term 12/13 Analysis, TU Clausthal
- Summer Term 11 Linear Operators, TU Berlin