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Professional Experience

- Sept. 2017 – Present **Ussher Assistant Professor in Numerical Analysis**, *Trinity College Dublin*, The University of Dublin, Ireland.
- June 2016 – June 2017 **Research Scientist**, *Johann Radon Institute for Computational and Applied Mathematics*, Linz, Austria.
- June 2012 – June 2016 **Universitätsassistent (Assistant Professor)**, *Industrial Mathematics Institute*, Johannes Kepler University, Linz, Austria.
- Jan. 2012 – Aug. 2012 **Dissertation Completion Fellowship**, *Temple University*, Philadelphia, PA.
- Sept. 2011 – Dec. 2011 **Teaching Assistantship**, *Temple University Department of Mathematics*, Philadelphia, PA.
- May 2011 – Aug. 2011 **Graduate Research Internship (Mentor: Michael Parks)**, *Computer Science Research Institute*, Sandia National Laboratory, Albuquerque, NM.
- May 2008 – May 2011 **Research Assistantship (Advisor: Daniel B. Szyld)**, *Temple University Department of Mathematics*, Philadelphia, PA.
- May 2004 – July 2006 **Technical Writer and Editor**, *University of Texas Health Science Center Department of Cardiothoracic and Vascular Surgery*, Houston, TX.

Education

- May 2012 **Ph.D., Mathematics**, *Temple University, Philadelphia*.
Title of dissertation: *Krylov Subspace Methods with Fixed Memory Requirements: Nearly Hermitian Linear Systems and Subspace Recycling* (Supervisor: Prof. Daniel B. Szyld)
- May 2010 **Master of Arts, Mathematics**, *Temple University, Philadelphia*.
- May 2004 **Bachelor of Science (Magna cum laude), Mathematics and English Literature**, Tulane University, *New Orleans*.
Thesis title: *An analysis of the Landen transformation* (supervisor: Prof. Victor H. Moll)

Publications

In Journals

1. **R. Herzog and K. M. Soodhalter**, *A modified implementation of MINRES to monitor residual subvector norms for block systems*, SIAM Journal on Scientific Computing, Accepted for Publication.
2. **K. M. Soodhalter**, *Stagnation of block GMRES and its relationship to block FOM*, Electronic Transactions on Numerical Analysis, Volume 46, 2017.
3. **J. Niebsch, R. Ramlau, and K. M. Soodhalter**, *Solution of coupled differential equations arising from imbalance problems*, Electronic Transactions on Numerical Analysis, Volume 46, 2017.
4. **K. M. Soodhalter**, *Two recursive GMRES-type methods for shifted linear systems with general preconditioning*, Electronic Transactions on Numerical Analysis, Volume 45, 2016, pp. 524–544.
5. **K. M. Soodhalter**, *Block Krylov Subspace Recycling for Shifted Systems with Unrelated Right-Hand Sides*, SIAM Journal on Scientific Computing, Volume 38, 2016, pp. A302–A324.
6. **K. M. Soodhalter**, *A block MINRES algorithm based on the banded Lanczos method*, Numerical Algorithms, Volume 69, 2015, pp. 473–494.

7. **K. M. Soodhalter, D. B. Szyld, and F. Xue**, *Krylov subspace recycling for sequences of shifted linear systems*, Applied Numerical Mathematics, Volume 81, 2014, pp. 105–118.
8. **M. Embree, J. A. Sifuentes, K.M. Soodhalter, D. B. Szyld, and F. Xue**, *Short-Term Recurrence Krylov Subspace Methods for Nearly-Hermitian Matrices*, *SIAM Journal on Matrix Analysis and Applications*, Volume 33, 2012, pp. 480–500.
9. **S. Robins, V. Moll, and K. Soodhalter**, *The Action of Hecke Operators on Hypergeometric Functions*, *Journal of the Australian Mathematical Society*, Volume 89, 2010, pp. 51–74.

Submitted for Publication

10. **M. L. Parks, K. M. Soodhalter, and D. B. Szyld**, *A block Recycled GMRES method with investigations into aspects of solver performance*, In Revision with SIAM Journal on Scientific Computing.

In Preparation

11. **L. Dykes, R. Ramlau, L. Reichel, K. M. Soodhalter, and R. Wagner**, *Lanczos-based fast blind deconvolution methods*.
12. **L. Reichel and K. M. Soodhalter**, *Augmentation in a Flexible GMRES Setting for Ill-posed Problems*.
13. **P. Hamberger, S. Janecek, and K. M. Soodhalter**, *Fast computation of the magnetization of an air-gapped transformer using a boundary element method*.

Presentations

Workshop talks

- October, 2016 **Stagnation of Block GMRES and Its Relationship to Block FOM**, *CIRM Conference on Numerical Linear Algebra and Applications*, Marseille, France.
- March 2016 **Finding Tensor Structure in an Ill-Posed Problem**, *RADON Institute "Inverse Problems in the ALPS" Workshop*, Obergurgel, Austria.
- June, 2014 **Minimum Residual Methods for Shifted Linear Systems with General Preconditioning**, *Householder Symposium*, Spa, Belgium.
- September 2012 **GMRES with Subspace Recycling for Shifted Linear Systems**, *Doktorkolleg Workshop*, Strobl, Austria.
- June 2011 **The Schur Complement Method for Nearly-Hermitian Linear Systems: An Effective Solver**, *Householder Symposium*, Tahoe City, CA.

Minisymposium talks

- June, 2017 **A Krylov subspace-based blind deconvolution method**, *Applied Inverse Problems*, Hangzhou, China.
- October, 2015 **Iterative Methods for Solving Shifted Linear Systems Built Upon a Block Matrix-vector Product**, *SIAM Applied Linear Algebra Meeting*, Atlanta, USA.
- August, 2015 **A pseudo-block Krylov subspace recycling approach for solving many shifted systems with arbitrary right-hand sides**, *The 8th International Congress on Industrial and Applied Mathematics*, Beijing, China.
- September, 2013 **Krylov Subspace Recycling: A Direct Projection Method for Solving Shifted Linear Systems**, *IFIP TC7 Conference on System Modelling and Optimization*, Klagenfurt, Austria.
- June 2012 **Krylov subspace recycling for families of shifted linear systems**, *SIAM Conference on Applied Linear Algebra*, Valencia, Spain.
- January 2012 **Block Krylov Subspace Recycling**, *Joint Mathematics Meeting*, Boston, MA.

Invited colloquium & seminar talks

- January, 2016 **Stagnation of Block GMRES and Its Relationship to Block FOM**, *Virginia Tech University*, Blacksburg, USA.
- January 2016 **Finding Tensor Structure in an Ill-Posed Problem**, *Temple University*, Philadelphia, USA.
- June 2015 **A Block Krylov subspace recycling approach for solving many shifted systems with arbitrary right-hand sides**, *Universität Innsbruck*, Innsbruck, Austria.

- April 2015 **Pseudo-Block recycled GMRES for solving shifted systems with unrelated right-hand sides**, *Academy of Sciences of the Czech Republic*, Prague, Czech Republic.
- September, 2014 **A Block GMRES-like algorithm for the simultaneous solution of shifted linear systems**, *TU Wuppertal*.
- November, 2013 **Minimum Residual Methods for Shifted Linear Systems with General Preconditioning**, *Università di Bologna Applied Mathematics Seminar*, Bologna.
- January 2012 **Automated Drawing of Weather Fronts**, *Community College of Philadelphia Math Club*, Philadelphia, PA.

Other talks

- July, 2016 **A modified implementation of MINRES to monitor the residual subvector norms for block systems**, *20th Conference of the International Linear Algebra Society*, Leuven, Belgium.
- March, 2016 **Stagnation of Block GMRES and Its Relationship to Block FOM**, *GAMM Annual Meeting*, Braunschweig, Germany.
- September, 2014 **A Block GMRES-like algorithm for the simultaneous solution of shifted linear systems**, *4th IMA Conference on Numerical Linear Algebra and Optimisation*, Birmingham, UK.
- July, 2014 **Minimum Residual Methods for Nonsymmetric Shifted Linear Systems with Preconditioning**, *GAMM-ALAMA Applied Linear Algebra Joint Meeting*, Barcelona.
- July 2013 **Block Krylov Subspace Recycling: Theory and Application in a Newton Iteration**, *International Conference On Preconditioning Techniques*, Prague, Czech Republic.
- June 2013 **Krylov Subspace Recycling for Families of Shifted Linear Systems**, *25th Biennial Numerical Analysis Conference*, Strathclyde.
- June, 2013 **Block Krylov Subspace Recycling: Theory and Application in a Newton Iteration**, *International Conference On Preconditioning Techniques For Scientific And Industrial Applications*, Oxford.
- September 2012 **Krylov subspace recycling for families of shifted linear systems**, *GAMM Workshop on Applied Linear Algebra*, Chateau Liblice, Czech Republic.
- July 2011 **A Schur Complement Method for Nearly Hermitian Linear Systems**, *The 7th International Congress on Industrial and Applied Mathematics*, Vancouver, Canada.
- November 2011 **Block Krylov Subspace Recycling**, *Mid Atlantic Numerical Analysis Day*, Philadelphia, PA.
- February 2011 **Automated Drawing of Weather Fronts**, *Temple University Society for Undergraduate Mathematics Seminar*, Philadelphia, PA.
- September 2010 **Automatic Weather Front Detection**, *Temple University Applied Math Seminar*, Philadelphia, PA.
- July 2010 **A Schur Complement Approach for Solving a Nearly Hermitian System**, *SIAM Annual Meeting*, Pittsburgh, PA.
- May 2010 **Automatic Weather Front Detection**, *Temple Applied Math Seminar*, Philadelphia, PA.
- October 2009 **Properties of Progressive GMRES and Flexible Conjugate Gradients**, *Temple Applied Math Seminar*, Philadelphia, PA.
- October 2009 **Properties and Stability of Progressive GMRES**, *SIAM Conference on Applied Linear Algebra*, Monterey, CA.

Projects

- July 2016-Present **Fast computation of magnetization in air-gapped transformers using a boundary element method**, with Stefan Janacek and Peter Hamberger.
- Jan. 2010 – Dec. 2010 **Semi-automated Measurement of Aortic Diameter for Diagnosis of Aortic Aneurysm**.
- Jan. 2010 – Jan. 2013 **Automatic Weather Front Detection**, with Meredith Hegg and Benjamin Seibold.

Software (available at website)

Subminres, *Matlab*.

Block MINRES based on Banded Lanczos, *Matlab*.

Shift Block Recycled GMRES, *Matlab*.

Block Recycled GMRES, *Matlab and Trilinos*.

Recycled GMRES for Shifted Linear Systems, *Matlab*.

Recursive recycled GMRES methods for shifted systems with preconditioning, *Matlab*.

Schur Complement Method (for nearly-Hermitian linear systems), *Matlab Serial and Parallel*.

Workshops attended

June 21–25, 2008 **SIAG/LA-SIMUMAT International Summer School on Numerical Linear Algebra**, *International Center for Mathematical Meetings*, Castro Urdiales, Cantabria, Spain.

July 20–28, 2010 **Industrial Mathematical and Statistical Modeling Workshop for Graduate Students**, *Center for Research in Scientific Computation*, Raleigh, NC, United States.

June 7–18, 2010 **2010 Gene Golub SIAM Summer School on Numerical Linear Algebra**, *Hotel Sierra Silvana*, Selva di Fasano, Bari, Italy.

Teaching Experience (in English unless otherwise noted)

Winter 2016 **Integral Equations and Boundary Value Problems**, *Lecturer*.

Spring 2016 **Mathematics for Chemists Exercises**, *Course Instructor*, (German).

Spring 2016 **Partial Differential Equations Exercises**, *Course Instructor*.

Winter 2015 **Integral Equations and Boundary Value Problems**, *Lecturer*.

Spring 2015 **Analysis II Exercises**, *Course Instructor*, (German).

Spring 2015 **Partial Differential Equations Exercises**, *Course Instructor*.

Winter 2014 **Mathematical Methods for Continuum Mechanics Exercises**, *Course Instructor*.

Winter 2014 **Integral Equations and Boundary Value Problems Exercises**, *Course Instructor*.

Spring 2014 **Analysis II Exercises**, *Course Instructor*, (German).

Spring 2014 **Partial Differential Equations Exercises**, *Course Instructor*.

Winter 2013 **Mathematical Methods for Continuum Mechanics Exercises**, *Course Instructor*.

Winter 2013 **Integral Equations and Boundary Value Problems Exercises**, *Course Instructor*, (German).

Spring 2013 **Krylov Subspace Methods**, *Lecturer*.

Spring 2013 **Partial Differential Equations Exercises**, *Course Instructor*.

Winter 2012 **Mathematical Methods for Continuum Mechanics Exercises**, *Course Instructor*.

Winter 2012 **Integral Equations and Boundary Value Problems Exercises**, *Course Instructor*.

Fall 2011 **College Algebra**, *Lecturer*.

Fall 2008 **Calculus III**, *Teaching Assistant*, Worked with students one-on-one.

Fall 2008 **Calculus II**, *Teaching Assistant*, Conducted recitations.

Spring 2008 **Precalculus**, *Lecturer*.

Fall 2007 **College Algebra**, *Lecturer*.

Spring 2007 **Calculus III**, *Teaching Assistant*, Worked with students one-on-one.

Fall 2006 **Calculus I**, *Teaching Assistant*, Worked with students one-on-one.

Membership in Professional Society

2011-Present **SIAM (Society for Industrial and Applied Mathematics)**, and member of its activity groups on **Applied Linear Algebra**.

Awards

- Spring 2012 **Dissertation Completion Fellowship**, *Temple University*.
2006-2008 **Dean's Graduate Scholarship**, *Temple University*, Philadelphia, PA.

Activities as Organizer & Service to Profession

- March 2017 **"Science Slam' Science Communication Event**, *Die Numerik: Wie ich lernte, mit Kevin zu rechnen*, First Place, Linz, Austria.
- October 2015 **Organization of minisymposium *Iterative Methods for Solving Families of Shifted Linear Systems***, *SIAM Applied Linear Algebra Meeting 2015*, Atlanta, USA (together with Martin van Gijzen).
- September 2013 **Organization of minisymposium *Iterative Methods for Ill-Posed Problems***, *IFIP TC7 Conference on System Modelling and Optimization*, Klagenfurt, Austria (together with Ronny Ramlau and Elena Resmerita).
- Fall 2011 **Undergraduate Mathematical Modeling Competition**, *Mentor and judge*, Temple University, Philadelphia, PA.
- Fall 2010 - 2012 **Grad Student Peer Resource**, *Resource for younger graduate students*, Temple University, Philadelphia, PA.

Editorial & Review Activities

- 2013-present **Managing editor**, *Electronic Transactions on Numerical Analysis*.
[Manuscripts reviewed for](#)
Electronic Transactions on Numerical Analysis.
SIAM Journal on Matrix Analysis.
SIAM Journal on Scientific Computing.
Applied Mathematics and Computation.
Computational Methods in Applied Mathematics.
Applied Numerical Mathematics.
Numerical algorithms.
Journal of Scientific Computing.
Numerical Mathematics: Theory, Methods and Applications.

Language Skills

- English **Native language.**
German **Written & oral fluency**, (*and working knowlege of Upper Austria dialect*).
- Spanish **Good knowledge.**

References

Available upon request.