Curriculum Vitae
Matthias Heinkenschloss

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Personal Data

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Date of Birth:	October 30, 1962.
Place of Birth:	Osterholz–Scharmbeck, Federal Republic of Germany.
Family Status:	Married, two children.
Citizenship:	German.
Residency Status:	Permanent Resident.

Educational Record

September 1991	Doctoral degree ”Dr. rer. nat.” summa cum laude, University of Trier, Fed. Rep. of Germany.
1988 – 1991	Study for doctoral degree at the University of Trier.
September 1988	Diploma in Mathematics (Minor Economics) at the University of Trier.
1983 – 1988	Study of Mathematics (Minor Economics) at the University of Trier.

Professional Record

Regular Positions

July 2005 – Present	Professor, Department of Computational and Applied Mathematics, Rice University
July 1996 – June 2005	Associate Professor, Department of Computational and Applied Mathematics, Rice University (July 1997, promotion to tenure at the rank of Associate Professor).
August 1993 – July 1996	Assistant Professor, Department of Mathematics, Virginia Polytechnic Institute and State University.

October 1992 – August 1993	Assistant Professor, University of Trier, Fed. Rep. of Germany.
October 1988 – September 1992	Assistant, University of Trier.

Research Stays

October 2003 – November 2003	Computer Science Research Institut, Sandia National Laboratories, Albuquerque, NM.
June 2003 – August 2003	International University Bremen, Bremen, Germany.
February 2003 – April 2003	Computer Science Research Institut, Sandia National Laboratories, Albuquerque, NM.
January 1991 – April 1991	North Carolina State University, Raleigh, NC. Supported by stipend of the Gottlieb Daimler and Karl Benz Foundation.
June 1990 – December 1990	Rice University, Houston, TX. Supported by stipend of the Gottlieb Daimler and Karl Benz Foundation.

Research

Research Interests

Numerical solution of large scale optimization problems, numerical solution of optimal control problems, numerical solution of parameter identification problems, optimization–level domain decomposition methods, preconditioning of KKT systems, error estimation for optimal control problems, model reduction, application of optimization in science and engineering.

Research Funding

Research is funded by the AirForce Office of Scientific Research, ExxonMobil, and the National Science Foundation.

Professional Service

Editorial Activities

July 1998 – Present Associate Editor *Systems & Control Letters*.

July 1998 – June 2002 Associate Editor of the SIAM book series *Frontiers of Applied Mathematics*.

July 1999 – June 2003, July 2007 – present Associate Editor of the MPS/SIAM book series.

January 2000 – Present Associate Editor, *Mathematical Programming, Series A*.

January 2000 – December 2005 Associate Editor, *SIAM Journal on Control and Optimization*.

January 2000 – May 2006 Associate Editor, *SIAM Review 'Problems and Techniques' Section*.

February 2008 – Present Member of the Editorial Board, *Numerical Linear Algebra with Applications*.

April 2001 – March 2003 Guest Editor, *Systems & Control Letters* Special Issue on *Optimization and Control of Distributed Systems* dedicated to J. L. Lions. *Systems & Control Letters*, Volume 48, Issues 3-4, March 2003.

Conferences Co–Organized

- with R. Hoppe and V. Schulz. Oberwolfach Workshop on *Numerical Techniques for Optimization Problems with PDE Constraints*, Mathematisches Forschungsinstitut Oberwolfach (MFO), Germany. To be held 2009.
- with D. C. Sorensen. Conference on *Adaptive Model Reduction Methods for PDE Constrained Optimization*, Rice University, May 17-19, 2006.
- with R. Hoppe and V. Schulz. Oberwolfach Workshop on *Numerical Techniques for Optimization Problems with PDE Constraints*, Mathematisches Forschungsinstitut Oberwolfach (MFO), Germany. Feb. 26-March 4, 2006.
- with L. N. Vicente (Universidade Coimbra, Portugal) and L. M. Fernandes (Institudo Politecnico de Tomar, Portugal). *Workshop on PDE Constrained Optimization*. Tomar, Portugal, July 26-19, 2005.
- with John E. Dennis (Rice U.), Amr El-Bakry (ExxonMobil), Tony Giunta (Sandia Nat. Labs.), Eric L. Mulkay (ExxonMobil), *Workshop on Surrogate Optimization*. Rice University, May 24 & 25, 2004.
- with L. Biegler, O. Ghattas, B. van Bloemen Waanders. *Second SANDIA Workshop on PDE Constrained Optimization: Toward Real-Time and Online PDE-Constrained Optimization*. Santa Fe, NM, May 19-21, 2004.
- with R. Hoppe and V. Schulz. Oberwolfach Workshop on *Numerical Techniques for Optimization Problems with PDE Constraints*, Mathematisches Forschungsinstitut Oberwolfach, Germany. February 16–22, 2003.
- with L. Biegler, O. Ghattas, B. van Bloemen Waanders. *First SANDIA Workshop on PDE Constrained Optimization*. Santa Fe, NM, April 4–6, 2001.

Membership in Professional Societies

Mathematical Programming Society,
SIAM (Society for Industrial and Applied Mathematics).

Selected Publications

For a full publication list see http://www.caam.rice.edu/∼heinken. Abstracts and, in most cases, links to electronic copies of the full paper are also available at http://www.caam.rice.edu/∼heinken.

1. K. SUN, R. GLOWINSKI, M. HEINKENSCHLOSS, and D. C. SORENSEN, *Domain Decomposition and Model Reduction of Systems with Local Nonlinearities*. *Proceedings of ENUMATH2007*, to appear.

2. M. HEINKENSCHLOSS and D. RIDZAL, *An Inexact Trust-Region SQP Method with Applications to PDE-Constrained Optimization. Proceedings of ENUMATH2007*, to appear.

3. M. HEINKENSCHLOSS, D. C. SORENSEN and K. SUN, *Balanced Truncation Model Reduction for a Class of Descriptor Systems with Application to the Oseen Equations*. *SIAM Journal on Scientific Computing*, Vol. 30, 2008, pp. 1038–1063.

4. M. HEINKENSCHLOSS and D. RIDZAL, *Integration of Sequential Quadratic Programming and Domain Decomposition Methods for Nonlinear Optimal Control Problems*. In U. Langer, M. Discacciati, D. Keyes, O. Widlund, and W. Zulehner (eds.), *Domain Decomposition methods in Science and Engineering XVII*, Lecture Notes in Computational Science and Engineering, Vol. 60. Springer Verlag, Berlin, Heidelberg, New York, pp. 69–80, 2008.

5. L. BIEGLER, O. GHATTAS, M. HEINKENSCHLOSS, D. KEYES, and B. VAN BLOEMEN WAANDERS (eds.), *Real-Time Optimization*. Computational Science and Engineering Vol. 3, SIAM, Philadelphia, 2007.

6. M. HEINKENSCHLOSS and M. HERTY, *A Spatial Domain Decomposition Method for Parabolic Optimal Control Problems*, *Journal of Computational and Applied Mathematics*, Vol. 201, 2007, pp. 88-111.

7. R. BARTLETT, M. HEINKENSCHLOSS, D. RIDZAL, and B. VAN BLOEMEN WAANDERS, *Domain Decomposition Methods for Advection Dominated Linear–Quadratic Elliptic Optimal Control Problems*, *Comp. Meth. Appl. Mech. Engng.*, Vol. 195, 2006, pp. 6428–6447.

8. M. HEINKENSCHLOSS and H. NGUYEN, *Neumann-Neumann Domain Decomposition Preconditioners for Linear Quadratic Elliptic Optimal Control Problems*, *SIAM Journal on Scientific Computing*, Vol. 28, 2006, pp. 1001–1028 (electronic).

9. F. ABRAHAM, M. BEHR, and M. HEINKENSCHLOSS, *Shape Optimization in Instationary Blood Flow*. *Computer Methods in Biomechanics and Biomedical Engineering*, Vol. 8, 2005, pp. 201–212.

10. F. ABRAHAM, M. BEHR, and M. HEINKENSCHLOSS, *Shape Optimization in Stationary Blood Flow: A Numerical Study of Non-Newtonian Effects*, *Computer Methods in Biomechanics and Biomedical Engineering*, Vol. 8, 2005, pp. 127–137.

11. M. HEINKENSCHLOSS, *Time–Domain Decomposition Iterative Methods for the Solution of Distributed Linear Quadratic Optimal Control Problems*, Journal of Computational and Applied Mathematics, Vol. 173, 2005, pp. 169–198.

12. F. ABRAHAM, M. BEHR, and M. HEINKENSCHLOSS, *The Effect of Stabilization in Finite Element Methods for the Optimal Boundary Control of the Oseen Equations*, *Finite Elements in Analysis and Design*, Vol. 41, 2004, pp. 229-251.

13. L. BIEGLER, O. GHATTAS, M. HEINKENSCHLOSS, and B. VAN BLOEMEN WAANDERS (eds.), *Large-Scale PDE-Constrained Optimization*. Lecture Notes in Computational Science and Engineering, Vol. 30, Springer-Verlag, Berlin, Heidelberg, New York, 2003.

14. S. S. COLLIS, K. GHAYOUR, and M. HEINKENSCHLOSS, *Optimal Transpiration Boundary Control for Aeroacoustics*, AIAA Journal, Vol. 41, 2003, pp. 1257–1270.

15. S. S. COLLIS, K. GHAYOUR, M. HEINKENSCHLOSS M. ULBRICH, and S. ULBRICH, *Optimal Control of Unsteady Compressible Viscous Flows*, International Journal for Numerical Methods in Fluids, Vol. 40, 2002, pp. 1401–1429

16. S. S. COLLIS, K. GHAYOUR and M. HEINKENSCHLOSS, *Optimal Control of Aeroacoustic Noise Generated by Cylinder Vortex Interaction*, International Journal of Aeroacoustics, Vol. 1, 2002, pp. 97–114.

17. M. HEINKENSCHLOSS and L. N. VICENTE, *Analysis of Inexact Trust-Region SQP Algorithms*, SIAM J. Optimization, Vol. 12, 2001, pp. 283-302.

Graduate Students Directed

- Sean Hardesty (in progress).
- Eelco Nederkoorn (in progress).
- Jonah Reeger (MA in progress).
- Klaus Wiegand (MA in progress).
- Kai Sun (in progress) (Directed jointly with D. C. Sorensen)
- Denis Ridzal (Ph.D. May 2006).
  Thesis title: *Trust-Region SQP Methods with Inexact Linear System Solves for Large-Scale Optimization*.
- Particia Howard (MA, August 2006). Thesis title: *Multigrid Methods for Elliptic Optimal Control Problems*.
- Agata Comas (Ph.D. December 2005).
  Thesis title: *Time-Domain Decomposition Preconditioners for the Solution of Discretized Parabolic Optimal Control Problems*.
- Hoang Nguyen (Ph.D. August 2004).
  Thesis title: *Domain Decomposition Methods for Linear-Quadratic Elliptic Optimal Control Problems*.
- Zhen Wang (Ph.D. December 2003).
  Thesis title: *A Generalized Trust Region SQP Algorithm for Equality Constrained Optimization*.
- Jesse Pietz (M.A., May 2003). Thesis title: *Pseudospectral Collocation Methods for the Direct Transcription of Optimal Control Problems*.
- Astrid Battermann (MA Department of Mathematics Virginia Tech, July 1996).
  Thesis title: *Preconditioner for Karush–Kuhn–Tucker Systems Arising in Optimal Control*.