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EDUCATION

- **Hamburg University of Technology**, PhD in Numerical Analysis: *Iterative Methods for Nonlinear Eigenvalue Problems*, June 2007
- **Oxford University**, visiting PhD student in the Numerical Analysis Group (Oct. 2004 – Sep. 2005)
- **Hamburg University of Technology**, Engineering Diploma (Diplom-Ingenieur) in Computer Science, December 2002
- **AGH University of Science and Technology**, Cracow (undergraduate Oct. 1997 – Sep. 1998)

EMPLOYMENT

- **The University of Manchester**, Research Associate, since February 2007
- **Hamburg University of Technology**, Scientific Employee, March 2003 - January 2007

AWARDS AND SCHOLARSHIPS

- Best Poster Prize, Bedlewo 2006 (German–Polish Workshop for Young Researchers in Applied and Numerical Linear Algebra)
- Rotary Ambassadorial Scholarship for study at the University of Oxford (Academic Year 2004/2005), 25,000\$
- "E-fellows.net" Career Network Online Scholarship (since 2001)
- Scholarship from AGH University of Science and Technology (Academic Year 1998/1999)

RESEARCH FUNDING

- Manchester Institute for Mathematical Sciences (MIMS) funding for the workshop New Directions in Tomographic Image Reconstruction in June 2008, 1500 GBP

RESEARCH INTERESTS

- Inverse problems
- Image reconstruction in X-ray Computed Tomography (CT) and Optical Tomography
- Compressed Sensing
- Numerical Linear Algebra

- Numerical Analysis
- Eigenvalue computations
- Structure preserving algorithms
- Application of large scale eigenvalue computations in quantum physics, structural mechanics and acoustics

ORGANISATION OF WORKSHOPS

- Organiser of the workshop “New Directions in Tomographic Image Reconstruction” (with Prof Bill Lionheart, Dr Wagner Muniz and Prof Philip Withers), June 2008, Manchester

PUBLICATIONS

PhD Thesis

- [1] M. M. Betcke, Iterative Projection Methods for Symmetric Nonlinear Eigenvalue Problems with Applications, PhD Thesis, Hamburg University of Technology, ISBN 3866242832 (2007)

In preparation

- [2] *M. M. Betcke and W. R. B. Lionheart, Multi-sheet surface rebinning methods*
- [3] *M. M. Betcke and H. Voss, Efficient computation of electronic states of quantum dots in the presence of a magnetic field*

Refereed

- [4] *M. M. Betcke and H. Voss, Restarting projection methods for rational eigenproblems arising in fluid-solid vibrations, Mathematical Modelling and Analysis 13(2), pp. 171-182 (2008)*
- [5] *M. M. Betcke and H. Voss, Numerical simulation of electronic properties of coupled quantum dots on wetting layers, Nanotechnology 19, 165204 (2008)*
- [6] *M. M. Betcke and H. Voss, Stationary Schrödinger equations governing electronic states of quantum dots in the presence of spin-orbit splitting, Applications of Mathematics 52(3), pp. 267-284 (2007)*
- [7] *M. Markiewicz and H. Voss, Electronic states in three dimensional quantum dot/wetting layer structures, International Conference on Computational Science and its Applications (ICCSA 2006), Lecture Notes in Computer Science 3980, pp. 684 – 693 (2006)*
- [8] *M. Markiewicz and H. Voss, A local restart procedure for iterative projection methods for nonlinear symmetric eigenproblems, Proceedings of ALGORITMY 2005, Slovak University of Technology, pp. 212–221 (2005)*

Unrefereed

- [9] *M. M. Betcke and H. Voss, Electron energy level calculations for semiconductor nanostructures, Proc. Appl. Math. Mech. 7, 1020403 – 1020404 (2007)*
- [10] *M. Markiewicz and H. Voss, Computing interior eigenvalues of conservative gyroscopic problems, Proc. Appl. Math. Mech. 4, pp. 674–675 (2004)*

Patents

- [11] M. M. Betcke and W. R. B. Lionheart, Method for image reconstruction by using multi-sheet surface rebinning, US Patent application number 61225257, 14-JUL-2009

Technical Reports

- [12] *M. M. Betcke and V. Lochmann and H. Voss, Computing interior eigenvalues of nonlinear Hermitean eigenvalue problems, Report 113, Institut für Numerische Simulation, Hamburg University of Technology, Hamburg, Germany (2007)*

TEACHING

The University of Manchester

- Lecturer, Further Mathematics for Civil Engineers, Spring 2009 (second half of the course)
- Tutor, Supervisions for Linear Algebra, Spring 2008 (3 groups of about 6–8 students)
- Lecturer for VCIPT course “Hands-on Practical Reconstruction using Matlab”, (industrial training course)

Hamburg University of Technology

- Numerical Analysis (TA), Spring 2004, 2006
- Seminar Numerical Linear Algebra (TA), Spring 2006
- Seminar Nonlinear Eigenvalue Problems (TA), Fall 2005
- Seminar Rank-Deficient and Discrete Ill-Posed Problems (TA), Fall 2003
- Numerical Analysis for Civil Engineers (TA), Spring 2003
- Computer Science for Engineers (TA), 1999 – 2000

Oxford University

- Integer Programming (TA), 2005

INVITED CONFERENCE TALKS, RESEARCH VISITS AND SEMINARS

- Visiting Prof Cathryn Mitchell and Dr Manuchehr Soleimani at the Department of Electronic and Electrical Engineering at the University of Bath, July 2008
- Workshop on Nonlinear Eigenvalue Problems, The University of Manchester, March 2007, “A Local Restart Technique for Symmetric Nonlinear Eigenvalue Problems”
- Research seminar “Minmax Principles for Rational Hermitian Eigenvalue Problems in the Band Structure Calculation of Semiconductor Quantum Dots”, The University of Manchester, November 2006
- Workshop on Nonlinear Eigenvalue Problems, Technische Universität Berlin, March 2006, “Nonlinear Eigenvalue Problems in Energy Band Calculation of Semiconductor Quantum Dots”

CONFERENCE PRESENTATIONS

- Oberwolfach Workshop, August 2009, Oberwolfach, Germany, “Computation of interior eigenvalues: Restarted Nonlinear Arnoldi” (participation by invitation only)
- Applied Inverse Problems, July 2009, Vienna, Austria, “Two-Sheet Surface Rebinning Method for New Generation Cone Beam CT” (poster presentation)
- Biennial Numerical Analysis Conference, June 2009, Glasgow, Scotland, “Rebinning Algorithms for Helical Cone Beam CT”
- Biennial Numerical Analysis Conference, June 2007, Dundee, Scotland, “Minmax Principle for Magnetic Stationary Schrödinger Equation”

- Joint GAMM–SIAM Conference on Applied Linear Algebra, July 2006, Düsseldorf, Germany, “Nonlinear Eigenvalue Problems in Energy Band Calculation of Semiconductor Quantum Dots”
- German–Polish Workshop for Young Researchers in Applied and Numerical Linear Algebra, February 2006 Bedlewo, Poland, “Numerical Simulation of Quantum Dots” (poster presentation, winner Best Poster Award)
- GAMM Workshop on Applied and Numerical Linear Algebra, September 2005, Dresden, Germany, “Numerical Simulation of Quantum Dots with Axial Symmetry”
- Biennial Numerical Analysis Conference, June/July 2005, Dundee, Scotland, “Numerical Simulation of Quantum Dots with Axial Symmetry”
- Internal Students Conference, Oxford University Computing Laboratory, December 2004, Oxford, England, “A Nonlinear Eigenvalue Problem (hands–on)”
- 25. Norddeutsches Kolloquium über Angewandte Analysis und Numerische Mathematik, May 2004, Hamburg, Germany, “Computing Interior Eigenvalues of Conservative Gyroscopic Problems”
- GAMM Annual Meeting, March 2004, Dresden, Germany, “Computing Interior Eigenvalues of Conservative Gyroscopic Problems”

OTHER INVITED CONFERENCE PARTICIPATIONS

- Ideas Factory on Tomographic Image Reconstruction and Analysis, March 2009, Mottram Hall, Manchester, UK (participation by invitation only)
- ECSON (Engineering and Computational Science for Oncology Network) Project Seminar, January 2009, Mottram Hall, Manchester, UK (participation by invitation only)
- London Mathematical Society Durham Symposium Computational Linear Algebra for Partial Differential Equations, July 2008, Durham, UK (participation by invitation only)
- Ideas Factory on Tomographic Image Reconstruction and Analysis, January 2008, Mottram Hall, Manchester, UK (participation by invitation only)

OTHER PROFESSIONAL ACTIVITIES

- Member of SIAM.
- Referee for *Inverse Problems*, *Inverse Problems in Science and Engineering*.
- PHILIPS SEMICONDUCTORS, internship, fixed–point implementation of image processing algorithms, 2002
- COREMEDIA AG, part–time employment, development of components of the Coremedia Content Management System, 2000/2001
- THYSSENKRUPP, contracted software development for the design of turbine components, 1999
- STILL GmbH, internship, 1999
- HAMBURG UNIVERSITY OF TECHNOLOGY, student research assistant, 1999, 2000, 2002

REFERENCES

- **Prof. W. R. B. Lionheart**, Bill.Lionheart@manchester.ac.uk
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