

HOUSEHOLDER SYMPOSIUM XVII

FINAL PROGRAM



Zeuthen, Germany
June 1-6, 2008

ROOM PLAN

- Plenary sessions are in room **Berlin-Zeuthen-Henningsdorf**.
- Parallel sessions are in rooms **Berlin-Zeuthen-Henningsdorf**, **Gotha-Magdeburg**, **Meißen**, and **Döllnsee**



Householder Symposium XVII – Program

	Monday	Tuesday	Wednesday	Thursday	Friday
08:30 – 09:05	Opening (8:45 – 9:05)	Mehrmann	Simoncini	Absil	Saad
09:05 – 09:40	Paige	Sorensen	Benzi	Tisseur	Demmel
09:40 – 10:15	Trefethen	Benner	Ernst	Koev (ILAS Speaker)	Householder Prize Talk
10:15 – 10:50	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>	<i>Coffee Break</i>
10:50 – 11:25	Tropp	Liesen	O’Leary	Dopico	Parallel 17-20
11:25 – 12:00	Vavasis	Elman		Stewart	Future of the Field (11:30 – 12:00)
12:00 – 14:00	<i>Lunch Break</i>	<i>Lunch Break</i>	<i>Lunch Break</i> (11:30 – 13:15)	<i>Lunch Break</i>	<i>Lunch Break</i>
14:00 – 14:35	Kilmer	Bai	Excursion (starts at 13:15)	Kressner	
14:35 – 15:10	Nagy	Dhillon		Moro	
15:10 – 15:45	Elden	Frommer		Embree	
15:45 – 16:30	<i>Coffee Break</i>	<i>Coffee Break</i>		<i>Coffee Break</i>	
16:30 – 18:30	Parallel 1-4	Parallel 9-12		Parallel 13-16	
18:30 – 21:00	<i>Dinner</i> (starts at 19:00)	<i>Dinner</i> (starts at 19:00)	Barbeque (18:30 – 22:30)	Banquet (19:30 – 23.30)	
21:00 – 22:00	Parallel 5-8				

Monday, June 2

- 8.45 – 9.05 Opening
9.05 – 9.40 *Chris Paige* Orthonormal completion of an array of unit length vectors
9.40 – 10.15 *Lloyd N. Trefethen* Continuous analogues of QR, LU, SVD and Schur
10.15 – 10.50 Coffee Break
10.50 – 11.25 *Joel A. Tropp* Algorithms for matrix column selection
11.25 – 12.00 *Stephen A. Vavasis* Algorithms and complexity for nonnegative matrix factorization
12.00 – 14.00 Lunch Break
14.00 – 14.35 *Misha E. Kilmer* A multilevel, modified total least norm approach to signal and image deblurring
14.35 – 15.10 *James G. Nagy* Separable nonlinear least squares problems in image processing
15.10 – 15.45 *Lars Eldén* Solving ill-posed Cauchy problems using rational Krylov methods
15.45 – 16.30 Coffee Break
16.30 – 18.30 Parallel Sessions 1 – 4
19.00 – 21.00 Dinner
21.00 – 22.00 Parallel Sessions 5 – 8

Parallel Session 1, *Eigenvalue problems (nonlinear)*, Room Berlin-Zeuthen

- 16.30 – 16.50 *Timo Betcke* Improving computed eigenpairs of polynomial eigenvalue problems by scaling and iterative refinement
16.50 – 17.10 *Shreemayee Bora* Structured eigenvalue condition number and backward error of a class of polynomial eigenvalue problems
17.10 – 17.30 *David Bindel* Error Bounds and Error Estimates for Nonlinear Eigenvalue Problems
17.30 – 17.50 *Christian Schröder* Numerical Solution of Palindromic Eigenvalue Problems
17.50 – 18.10 *Steven Mackey* Linearizations of Singular Matrix Polynomials and the Recovery of Minimal Indices

Parallel Session 2, *Iterative methods for linear systems*, Room Gotha-Magdeburg

- 16.30 – 16.50 *Ronald B. Morgan* Solution of Linear Equations for Quantum Chromodynamics
- 16.50 – 17.10 *Luc Giraud* Convergence in backward error of relaxed GMRES
- 17.10 – 17.30 *Chen Greif* A Conjugate Gradient Method for Skew-Symmetric Matrices
- 17.30 – 17.50 *Karl Meerbergen* Recycling Ritz vector for the solution of parameterized linear systems
- 17.50 – 18.10 Petr Tichý On a New Proof of the Faber-Manteuffel Theorem
- 18.10 – 18.30 *Gérard Meurant* New results on the Lanczos and Conjugate Gradient algorithms

Parallel Session 3, *Model reduction, DAEs*, Room Meißen

- 16.30 – 16.50 *Thanos Antoulas* Model reduction by means of fast frequency sweep
- 16.50 – 17.10 *Ulrike Baur* Control-oriented Model Reduction for Parabolic Systems
- 17.10 – 17.30 *Andras Varga* Numerical Methods for Continuous-time Periodic Systems
- 17.30 – 17.50 *Nancy Nichols* Model Reduction in Variational Data Assimilation
- 17.50 – 18.10 *Elena Virnik* Positive Descriptor Systems
- 18.10 – 18.30 *Bo Kågström* Product Eigenvalue Problems in Applications: Computing Periodic Deflating Subspaces Associated with a Specified Set of Eigenvalues

Parallel Session 4, *Direct methods, Eigenvalues*, Room Döllnsee

- 16.30 – 16.50 *Jennifer A. Scott* The World of (HSL) Sparse Direct Solvers
- 16.50 – 17.10 *Sue Dollar* Sparse direct methods need not suffer under dense rows
- 17.10 – 17.30 *Ian Duff* Practical Rank Determination for Square and Rectangular Sparse Matrices
- 17.30 – 17.50 *Julien Languo* Reduce factorizations
- 17.50 – 18.10 *Charles Johnson* A question about Eigenvalues of Tridiagonal Matrices and Motivation for it
- 18.10 – 18.30 *Zdeněk Strakoš* Sensitivity of Gauss-Christoffel quadrature, and sensitivity of the Jacobi matrix to small perturbations of the spectral data

Parallel Session 5, *Eigenvalue problems*, Room Berlin-Zeuthen

- 21.00 – 21.20 *Achiya Dax* From Eigenvalues to singular values: The Rectangular Quotients Equality and Related Issues
21.20 – 21.40 *Hongguo Xu* Perturbation of Purely Imaginary Eigenvalues of Hamiltonian Matrices under Structured Perturbations
21.40 – 22.00 *Robert Granat* Parallel Eigenvalue Reordering in Real Schur Forms

Parallel Session 6, *Matrix functions*, Room Gotha-Magdeburg

- 21.00 – 21.20 *James V. Lambers* Robust Computation of Off-Diagonal Elements of Functions of Matrices
21.20 – 21.40 *Mario Arioli* Matrix square root and interpolation spaces
21.40 – 22.00 *Nick Higham* Computing the Fréchet Derivative of the Matrix Exponential, with an application to Condition Number Estimation

Parallel Session 7, *Miscellaneous*, Room Meißen

- 21.00 – 21.20 *Christos Kravvaritis* On the Growth Factor for Hadamard Matrices
21.20 – 21.40 *Ioana Dumitriu* Fast Linear Algebra is Stable
21.40 – 22.00 *Alan Edelman* Mathematical Software Going Forward

Parallel Session 8, *Miscellaneous*, Room Döllnsee

- 21.00 – 21.20 *Herman Mena* Numerical Solution of Large-Scale Differential Riccati Equations
21.20 – 21.40 *Serkan Gugercin* Structured perturbation theory for inexact Krylov projection methods in model reduction
21.40 – 22.00 *Nicola Mastronardi* On Things of Little Interest: How to Compute Low Paying Annuities

Tuesday, June 3

- 8.30 – 9.05 *Volker Mehrmann* Numerical computation of Sacker-Sell exponents for differential-algebraic equations
- 9.05 – 9.40 *Danny C. Sorensen* Computation and application of balanced model order reduction
- 9.40 – 10.15 *Peter Benner* Solving algebraic Riccati equations for stabilization of incompressible flows
- 10.15 – 10.50 Coffee Break
- 10.50 – 11.25 *Jörg Liesen* On nonsymmetric saddle point matrices that allow conjugate gradient iterations
- 11.25 – 12.00 *Howard C. Elman* Preconditioners for eigenvalue problems arising in linear stability analysis
- 12.00 – 14.00 Lunch Break
- 14.00 – 14.35 *Zhaojun Bai* Robust and efficient methods for multi-length scale matrix computations and applications in quantum mechanical simulations
- 14.35 – 15.10 *Inderjit Dhillon* The log-determinant divergence and its applications
- 15.10 – 15.45 *Andreas Frommer* Algebraic multigrid methods for Laplacians of graphs
- 15.45 – 16.30 Coffee Break
- 16.30 – 18.30 Parallel Sessions 9 – 12
- 19.00 – 21.00 Dinner

Parallel Session 9, *Eigenvalue problems*, Room Berlin-Zeuthen

- 16.30 – 16.50 *Andreas Stathopoulos* An unrestarted, one-pass Lanczos with on-the-fly updating of eigenvectors
- 16.50 – 17.10 *Wolfgang Wülling* On clustered Ritz values in the Lanczos Method
- 17.10 – 17.30 *Karen Braman* Middle Deflations in the *QR* Algorithm
- 17.30 – 17.50 *Raf Vandebril* A Rational Generalization of the *QR*-algorithm
- 17.50 – 18.10 *Alastair Spence* Preconditioning the shift-invert transform in large sparse eigenvalue computations
- 18.10 – 18.30 *Melina A. Freitag* Inexact Preconditioned Shift-and-Invert Arnoldi's Method and Implicit Restarts for Eigencomputations

Parallel Session 10, *Iterative methods for linear systems*, Room Gotha-Magdeburg

- 16.30 – 16.50 *Kees Vuik* On complex shifted Laplace preconditioners for the vector Helmholtz equation
- 16.50 – 17.10 *Reinhard Nabben* Multilevel Krylov Methods based on Projections derived from Deflation, Domain Decomposition, and Multigrid Iterations
- 17.10 – 17.30 *Yogi A. Erlangga* Multilevel Krylov-Multigrid Method for the 2D Indefinite Helmholtz Equation
- 17.30 – 17.50 *Matthias Bollhöfer* Algebraic multigrid for Helmholtz equations
- 17.50 – 18.10 *Owe Axelsson* An additive subspace correction method combined with an ADI-type splitting
- 18.10 – 18.30 *Martin Gander* An Optimal Complexity Algorithm for Non-Matching Grid Projections

Parallel Session 11, *Matrix approximation*, Room Meißen

- 16.30 – 16.50 *Petros Drineas* The Column Subset Selection Problem
- 16.50 – 17.10 *Berkent Savas* Grassmann-Quasi-Newton Algorithms for best Multilinear Rank Approximation of Tensors
- 17.10 – 17.30 *Marc Van Barel* A Generalization of the *QR*-algorithm for Semiseparable plus Diagonal Matrices
- 17.30 – 17.50 *Krystyna Ziętak* On Some Known and Open Matrix Nearness Problems
- 17.50 – 18.10 *Charles Van Loan* Multilinear Algebra Computations in Quantum Chemistry
- 18.10 – 18.30 *Efsthatios Gallopoulos* Linear Algebra Tools for Link Analysis and Dimensionality Reduction

Parallel Session 12, *Least squares*, Room Döllnsee

- 16.30 – 16.50 *Xiao-Wen Chang* Solving Integer Linear Least Squares Problems
- 16.50 – 17.10 *Esmond G. Ng* Solving Sparse Least-Squares Problems Using Perturbed QR Factorizations
- 17.10 – 17.30 *Brian D. Sutton* Computing the Complete CS Decomposition
- 17.30 – 17.50 *David Titley-Peloquin* Stopping Criteria for LSQR
- 17.50 – 18.10 *Archana Pacheenburawana* A One-sided Jacobi Method for Computing the Symplectic SVD
- 18.10 – 18.30 *Åke Björk* Band Householder/Lanczos Methods for Least Squares with Multiple Right Hand Sides

Wednesday, June 4

- 8.30 – 9.05 *Valeria Simoncini* Approximating functions of large matrices:
Computational aspects and applications
- 9.05 – 9.40 *Michele Benzi* Localization phenomena in matrix functions:
Theory, algorithms, applications
- 9.40 – 10.15 *Oliver G. Ernst* A Posteriori error estimators for Krylov subspace
approximations of matrix functions
- 10.15 – 10.50 Coffee Break
- 10.50 – 11.25 *Dianne P. O’Leary* Regularization by residual periodograms
- 11.30 – 13.15 Lunch Break
- 13.15 – 17.00 Excursion
- 18.30 – 22.30 Barbeque

Thursday, June 5

- 8.30 – 9.05 *Pierre-Antoine Absil* Differential-geometric foundations of Jacobi-Davidson methods
- 9.05 – 9.40 *Françoise Tisseur* How to detect and solve hyperbolic quadratic eigenvalue problems
- 9.40 – 10.15 *Plamen Koev (ILAS speaker)* Computing eigenvalues of random matrices
- 10.15 – 10.50 Coffee Break
- 10.50 – 11.25 *Froilán M. Dopico* An orthogonal and symmetric high relative accuracy algorithm for the symmetric eigenproblem
- 11.25 – 12.00 *G. W. Stewart* Analysis of the residual Arnoldi method
- 12.00 – 14.00 Lunch Break
- 14.00 – 14.35 *Daniel Kressner* Computation of structured pseudospectra
- 14.35 – 15.10 *Julio Moro* Structured condition numbers for multiple eigenvalues
- 15.10 – 15.45 *Mark Embree* Damped mechanical systems: Spectra, pseudospectra, structured perturbations
- 15.45 – 16.30 Coffee Break
- 16.30 – 18.30 Parallel Sessions 13 – 16
- 19.30 – 23.30 Banquet
- After dinner talk: *Jim Varah* A historical look at Householder Meetings

Parallel Session 13, *Matrix approximation*, Room Berlin-Zeuthen

- 16.30 – 16.50 *Serge Gratton* Quasi-Newton formula, matrix nearness problems and preconditioning
- 16.50 – 17.10 *Carla D. Martin* A Tensor SVD
- 17.10 – 17.30 *Gilbert Strang* Compressed Sensing and Random Matrices
- 17.30 – 17.50 *Eugene Tyrtyshnikov* Tensor rank estimates and tensor-based algorithms

Parallel Session 14, *Eigenvalue problems*, Room Gotha-Magdeburg

- 16.30 – 16.50 *Ilse Ipsen* Perturbation Bounds for Determinants and Characteristic Polynomials
- 16.50 – 17.10 *Michiel Hostenbach* On the computation of real and purely imaginary eigenvalues of large sparse matrices
- 17.10 – 17.30 *Bor Plestenjak* Jacobi–Davidson Method for Two-Parameter Eigenvalue Problems
- 17.30 – 17.50 *Luka Grubišić* Numerical linear algebra for spectral theory of block operator matrices
- 17.50 – 18.10 *Elias Jarlebring* Some perturbation results for nonlinear eigenvalue problems
- 18.10 – 18.30 *Andrew V. Knyazev* Rayleigh-Ritz majorization error bounds with applications to FEM and subspace iterations

Parallel Session 15, *Iterative methods for linear systems*, Room Meißen

- 16.30 – 16.50 *Martin Van Gijzen* IDR(s): a family of simple and fast algorithms for solving large nonsymmetric systems of linear equations
- 16.50 – 17.10 *Miroslav Tuma* Balancing Incomplete Factorizations for Preconditioning
- 17.10 – 17.30 *Jurjen Duintjer Tebbens* An Updated Preconditioner for Sequences of General Nonsymmetric Linear Systems
- 17.30 – 17.50 *Maya Neytcheva* Exploiting the Finite Element framework to construct two-by-two block preconditioners
- 17.50 – 18.10 *Miro Rozložník* Numerical behavior of saddle–point solvers
- 18.10 – 18.30 *Michael Overton* Preconditioning for Semidefinite Programming

Parallel Session 16, *Applications*, Room Döllnsee

- 16.30 – 16.50 *Marco Donatelli* The antireflective algebra with applications to image deblurring
- 16.50 – 17.10 *Marielba Rojas* LSTRS: MATLAB Software for Large-Scale Trust-Region Subproblems and Regularization
- 17.10 – 17.30 *Michael M. Mahoney* Statistical Leverage and Improved Matrix Algorithms
- 17.30 – 17.50 *John M. Conroy* The Linear Algebra of a Multi-document Summarization System
- 17.50 – 18.10 *Stefano Serra-Capizzano* Google PageRanking problem: the model and the analysis
- 18.10 – 18.30 *Eric de Sturler* Matrix Analysis Problems arising in Fast Implementations of the Quantum Monte Carlo Method

