

Householder Symposium XXII

Cornell University, Ithaca

8 - 13 June 2025



Sunday

7:00–9:00	Welcome Reception – Statler Ballroom
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Monday

8:00–8:50	Breakfast – Statler Ballroom
8:50–9:00	Opening Remarks – Statler Auditorium
09:00–09:25	Plenary session (9:00–10:15) – Statler Auditorium <i>Haim Avron</i> , Numerical Linear Algebra on Quantum Computers Made Simple <i>Grey Ballard</i> , Accelerating Randomized Tensor Decompositions using Structured Random Matrices <i>Peter Benner</i> , Learning Globally Stable Dynamics — a Matrix-theoretic Perspective
09:25–09:50	
09:50–10:15	
10:15–10:45	Coffee Break – Statler Atrium
10:45–11:10	Plenary session (10:45–12:00) – Statler Auditorium <i>Nicolas Boullé</i> , Operator Learning without the Adjoint <i>Matthias Chung</i> , Bridging Linear Algebra and Autoencoders <i>Inderjit S. Dhillon</i> , CASPR: Combining Axis Preconditioners using Kronecker Sums/Products for Training Large Neural Networks
11:10–11:35	
11:35–12:00	
12:00–13:30	Lunch Break – Statler Ballroom
13:30–13:55	Parallel session (13:30–15:10) Track A – Statler Auditorium <i>Michał Dereziński</i> , Randomized Algorithms for Solving Linear Systems with Low-rank Structure <i>Younghyun Cho</i> , Surrogate-based Autotuning for Randomized Numerical Linear Algebra <i>Liam Burke</i> , Krylov Subspace Recycling With Randomized Sketching For Matrix Functions <i>Ethan N. Epperly</i> , Randomly Pivoted Cholesky: Near-Optimal Positive Semidefinite Low-Rank Approximation from a Small Number of Entry Evaluations
13:55–14:20	
14:20–14:45	
14:45–15:10	
13:30–13:55	Track B – Statler Hall 196 <i>Angelo A. Casulli</i> , A low-memory Lanczos method with rational Krylov compression for matrix functions <i>Andrew Horning</i> , Contour Integral Methods for Exponentials of Matrices and Operators with Explicit High-Order Error Bounds <i>Eric de Sturler</i> , Sketched GCRODR and its Convergence Analysis <i>Jesse L. Barlow</i> , Deflation for the Half-Arrow Singular Value Decomposition
13:55–14:20	
14:20–14:45	
14:45–15:10	
13:30–13:55	Track C – Statler Hall 198 <i>Alberto Bucci</i> , Streaming low-rank approximation of tree tensor networks <i>Harshit Kapadia</i> , On a Multi-Stage Tensor Reduction Strategy for Arbitrary Order-p Tensorial Data under the Tensor T-Product Algebra <i>Ion Victor Gosea</i> , H2 optimal model reduction of linear systems with quadratic outputs: from rational function interpolation to data-driven modeling <i>Sven-Erik Ekström</i> , Matrix-less spectral approximation for large structured matrices
13:55–14:20	
14:20–14:45	
14:45–15:10	
15:10–15:40	Coffee Break – Statler Atrium
15:40–16:05	Parallel session (15:40–17:45) Track A – Statler Auditorium <i>Thanos Antoulas</i> , Rational Interpolation, the Loewner Framework and the Kolmogorov Superposition Theorem <i>Miryam Gnazzo</i> , Numerical Approximation of the Distance to Singularity for Matrix-valued Functions
16:05–16:30	

16:30–16:55	<i>Anne Greenbaum</i> , When is the Resolvent Like a Rank One Matrix?
16:55–17:20	<i>Luka Grubišić</i> , Subspace accelerated contour integration methods for eigenvalue problems
17:20–17:45	<i>Rajarshi Bhattacharjee</i> , Improved Spectral Density Estimation via Explicit and Implicit Deflation
	Track B – Statler Hall 196
15:40–16:05	<i>Giovanni Barbarino</i> , On the Computation of the Maximum Conic Singular Values
16:05–16:30	<i>Johannes J. Brust</i> , Streaming the Bidiagonal Factorization
16:30–16:55	<i>Joshua Cape</i> , Robust Spectral Clustering with Rank Statistics
16:55–17:20	<i>Mark Embree</i> , Spectral Computations for Quasicrystal Models
17:20–17:45	<i>Jorge Garza-Vargas</i> , Proving Rapid Global Convergence for the Shifted QR Algorithm
	Track C – Statler Hall 198
15:40–16:05	<i>Matthias Bolten</i> , Parallelization of all-at-once preconditioned solvers for time-dependent PDEs
16:05–16:30	<i>Daniel Fortunato</i> , Interpolated Compressed Inverse Preconditioning: Fast and Accurate Simulation of Close-to-Touching Discs in Stokes Flow
16:30–16:55	<i>Cade Ballew</i> , The Akhiezer iteration for matrix functions and Sylvester equations
16:55–17:20	<i>Grace Dinh</i> , General Methods for Sparsity Structure Description and Cost Estimation
17:20–17:45	<i>Zhaojun Bai</i> , Some Modified Matrix Eigenvalue Problems
18:00–20:00	Dinner – Statler Ballroom

Tuesday

8:00–9:00	Breakfast – Statler Ballroom
09:00–09:25	Plenary session (9:00–10:15) – Statler Auditorium <i>Massimiliano Fasi</i> , High-Accuracy Floating-Point Matrix Multiplication on Low-Precision Floating-Point and Fixed-Point Hardware
09:25–09:50	<i>Silvia Gazzola</i> , Flexible Golub-Kahan Factorization for Linear Inverse Problems
09:50–10:15	<i>Laura Grigori</i> , Randomization techniques for solving eigenvalue problems
10:15–10:45	Coffee Break – Statler Atrium
10:45–11:10	Plenary session (10:45–11:50) – Statler Auditorium <i>Ilse C.F. Ipsen</i> , Least squares solvers based on randomized normal equations
11:10–11:35	<i>Julien Langou</i> , New results on the I/O complexity of some Numerical Linear Algebra kernels
11:35–12:00	<i>Daniel B. Szyld</i> , Asynchronous methods meet randomized: Provable convergence rate
12:00–13:30	Lunch Break – Statler Ballroom
	Parallel session (13:30–15:10) Track A – Statler Auditorium
13:30–13:55	<i>Serkan Gugercin</i> , Separable Low-rank Barycentric Forms in the p-AAA Algorithm
13:55–14:20	<i>Diana Halikias</i> , Robust Hierarchical Matrix Approximation from Sketches
14:20–14:45	<i>Sherry Li</i> , Adaptive Sketching Based Construction of \mathcal{H}^2 Matrices on GPUs
14:45–15:10	<i>Mikhail Lepilov</i> , Spectral Density Estimation of Kernel Matrices with Applications
	Track B – Statler Hall 196
13:30–13:55	<i>Alan Edelman</i> , Julia, portable Numerical Linear Algebra, and beyond
13:55–14:20	<i>Sean Y. Hon</i> , Optimal preconditioners for nonsymmetric multilevel Toeplitz systems with application to solving non-local evolutionary PDEs
14:20–14:45	<i>Yongseok Jang</i> , Randomized orthogonalization in GMRES with deflation and augmentation
14:45–15:10	<i>Bernhard Heinzelreiter</i> , Efficient Iterative Methods for the Solution of Sparse Tree-Coupled Saddle-Point Systems
	Track C – Statler Hall 198
13:30–13:55	<i>Zehua Lai</i> , Most matrix manifold optimization problems are NP-hard
13:55–14:20	<i>Yunhui He</i> , Convergence Analysis for Nonlinear GMRES

14:20–14:45	<i>Xin Liang</i> , Stochastic algebraic Riccati equations are almost as easy as deterministic ones
14:45–15:10	<i>Sungwoo Jeong</i> , On the Convergence of the Singular Value Expansion of 2D functions
15:10–15:40	Coffee Break – Statler Atrium
	Parallel session (15:40–17:45)
	Track A – Statler Auditorium
15:40–16:05	<i>Santolo Leveque</i> , Fast Solvers for the Runge–Kutta Integration of the Instationary Incompressible Navier–Stokes Equations
16:05–16:30	<i>Ding Lu</i> , Convergence Analysis of SCF Iteration for Eigenvector-Dependent Nonlinear Eigenvalue Problems
16:30–16:55	<i>Mattia Manucci</i> , Solving generalized Lyapunov equations with guarantees: application to the reduction of linear switched systems
16:55–17:20	<i>Stefano Massei</i> , On the quasiseparability of the solution of continuous-time Riccati equations with quasiseparable coefficients
17:20–17:45	<i>Froilán Dopico</i> , Structured rational matrices: properties and strongly minimal linearizations
	Track B – Statler Hall 196
15:40–16:05	<i>Ron Morgan</i> , Krylov Methods and Polynomials
16:05–16:30	<i>Alexis Montoison</i> , MinAres: An Iterative Solver for Symmetric Linear Systems
16:30–16:55	<i>Keiichi Morikuni</i> , Block cross-interactive residual smoothing for Lanczos-type solvers for linear systems with multiple right-hand sides
16:55–17:20	<i>Yuxin Ma</i> , Backward stability of s-step GMRES
17:20–17:45	<i>Anna Ma</i> , Randomized Kaczmarz on doubly noisy systems and its applications
	Track C – Statler Hall 198
15:40–16:05	<i>Hengrui Luo</i> , Building Scalable Tensor Regression Models: Linear Solvers and Beyond
16:05–16:30	<i>D. Steven Mackey</i> , Sign Characteristic in the Inverse Problem for Hermitian Matrix Polynomials
16:30–16:55	<i>Maike Meier</i> , Exploiting mathematical structures in spectral imaging to accelerate experiments and improve iterative reconstructions
16:55–17:20	<i>Steffen W. R. Werner</i> , Structured Representations of Rational Functions for Learning Mechanical Dynamical Systems: A Barycentric Approach
17:20–17:45	<i>Zlatko Drmač</i> , Numerical linear algebra for data driven analysis of nonlinear dynamics: Koopman-Schur Decomposition
18:00–20:00	Dinner and Poster Blitz – Statler Ballroom
20:00–21:30	Poster Session – Statler Terrace (Basement)

Wednesday

8:00–9:00	Breakfast – Statler Ballroom
	Plenary session (9:00–10:15) – Statler Auditorium
09:00–09:25	<i>Cleve Moler</i> , A Million-Dollar Matrix
09:25–09:50	<i>Elizabeth Newman</i> , Optimal Matrix-Mimetic Tensor Algebras
09:50–10:15	<i>Vanni Noferini</i> , Riemannian optimization for matrix nearness problems
10:15–10:45	Coffee Break – Statler Atrium
	Plenary session (10:45–12:00) – Statler Auditorium
10:45–11:10	<i>Eda Oktay</i> , Recent Advances in Mixed-Precision (Hybrid) Iterative Methods
11:10–11:35	<i>Elizabeth Qian</i> , The Fundamental Subspaces of Ensemble Kalman Inversion
11:35–12:00	<i>Malena Sabaté Landman</i> , Inner-product free Krylov subspace methods for inverse problems
12:00–13:00	Lunch Break – Statler Ballroom
13:15–18:00	Excursion
19:00–22:00	Banquet – Statler Ballroom

Thursday

8:00–9:00	Breakfast – Statler Ballroom
09:00–09:25	Plenary session (9:00–10:45) – Statler Auditorium <i>Ryan Schneider</i> , Symmetric Pseudospectral Shattering and Fast Divide-and-Conquer for the Definite Generalized Eigenvalue Problem
09:25–09:50	<i>Jemima M. Taboart</i> , Preconditioning Weak-Constraint 4D-Var: A Parallelisable Implementation in Firedrake
09:50–10:15	<i>Françoise Tisseur</i> , Computing Accurate Eigenvalues of Symmetric Matrices With a Mixed Precision Jacobi Algorithm
10:15–10:40	<i>Lloyd N. Trefethen</i> , From Zolotarev problems in linear algebra to a new approach to quadrature
10:40–11:10	Coffee Break – Statler Atrium
11:10–11:35	Parallel session (11:10–12:00) Track A – Statler Auditorium <i>Andrew J. Higgins</i> , Randomized Householder-Cholesky QR Factorization with Multisketching
11:35–12:00	<i>Yuji Nakatsukasa</i> , A fast algorithm for low-rank approximation with error control
11:10–11:35	Track B – Statler Hall 196 <i>Esmond G. Ng</i> , Recent Results on Improving Performance of Sparse Cholesky Factorization by Reordering Columns within Supernodes
11:35–12:00	<i>Michal Outrata</i> , Absorbing boundary conditions form Padé approximants (sometimes): continued fractions are the key
11:10–11:35	Track C – Statler Hall 198 <i>Jan Papež</i> , Error estimate and stopping criteria for least-squares problems solved by CG-like algorithms CGLS and LSQR
11:35–12:00	<i>Taejun Park</i> , AdaCUR: Efficient Low-rank Approximation of Parameter-dependent matrices $A(t)$ via CUR decomposition
12:00–13:30	Lunch Break – Statler Ballroom
13:30–13:55	Parallel session (13:30–15:10) Track A – Statler Auditorium <i>Mirjeta Pasha</i> , Efficient Dynamic Image Reconstruction with Motion Estimation
13:55–14:20	<i>John W. Pearson</i> , Fast Iterative Solvers for Optimization of Nonlocal PDEs
14:20–14:45	<i>David Persson</i> , Randomized Nyström approximation of non-negative self-adjoint operators
14:45–15:10	<i>John Peca-Medlin</i> , Global and local growth behavior of GEPP and GECP
13:30–13:55	Track B – Statler Hall 196 <i>Elizaveta Rebrova</i> , On efficiency and adaptivity of sketch-and-project approach in randomized linear solvers
13:55–14:20	<i>Stefano Pozza</i> , Matrix equations from the \star -algebra with quantum chemistry applications
14:20–14:45	<i>Bor Plestenjak</i> , A Randomized Numerical Method for Joint Eigenvalues of Commuting Matrices
14:45–15:10	<i>Michele Rinelli</i> , Analysis of Stochastic Probing Methods for Estimating the Trace of Functions of Sparse Symmetric Matrices
13:30–13:55	Track C – Statler Hall 198 <i>Rikhav Shah</i> , Sparse Pseudospectral Shattering
13:55–14:20	<i>Igor Simunec</i> , Estimation of Spectral Gaps for Sparse Symmetric Matrices
14:20–14:45	<i>Navjot Singh</i> , Alternating Mahalanobis Distance Minimization for CP Tensor Decomposition
14:45–15:10	<i>Aleksandros Sobczyk</i> , Algorithms for Hermitian eigenproblems and their complexity
15:10–15:30	Coffee Break – Statler Atrium

	Parallel session (15:40–17:45)
	Track A – Statler Auditorium
15:40–16:05	<i>Nicole Spillane</i> , GMRES with Preconditioning, Weighted norm and Deflation
16:05–16:30	<i>Andreas Stathopoulos</i> , Evaluating and improving streaming methods for large scale SVD problems
16:30–16:55	<i>Jianlin Xia</i> , Matrix Analysis and Fast Solvers for Neural Network Computations
16:55–17:20	<i>Ning Zheng</i> , Iterative Methods for Sylvester-like Variational Inequality Problems
17:20–17:45	<i>André Uschmajew</i> , Accelerating operator Sinkhorn iteration with overrelaxation
	Track B – Statler Hall 196
15:40–16:05	<i>Niel Van Buggenhout</i> , Numerically generating Sobolev orthogonal polynomials
16:05–16:30	<i>Bart Vandereycken</i> , Spectral problems through the lens of optimization: new ideas and improved algorithms?
16:30–16:55	<i>Wim Vanroose</i> , Subspace methods with asymptotic Krylov convergence for bounded variable problems.
16:55–17:20	<i>David S. Watkins</i> , Bulge Chasing is Pole Swapping
17:20–17:45	<i>Yuanzhe Xi</i> , Data-driven Numerical Methods for Kernel Matrices
	Track C – Statler Hall 198
15:40–16:05	<i>Xiaobai Sun</i> , Sparsify Latent Factor Matrix by Householder Transformations
16:05–16:30	<i>Fei Xue</i> , A block conjugate gradient method with polynomial filters for symmetric eigenvalue problems: practice and global quasi-optimality
16:30–16:55	<i>Mikhail Zaslavskiy</i> , Adaptive data-driven reduced-order models of port-Hamiltonian dynamical systems for nonlinear inverse scattering applications
16:55–17:20	<i>Jörn Zimmerling</i> , Monotonicity, Bounds, and Averaging of Block-Gauss and Gauss-Radau Quadrature for Computing $B^T f(A)B$
17:20–17:45	<i>Frank Uhlig</i> , On the Unitary Block-Diagonalisation of General Matrices and Applications
18:00–18:25	Housholder Prize lecture(s) – Statler Auditorium
18:30–20:00	Dinner – Statler Ballroom

Friday

8:00–9:00	Breakfast – Statler Ballroom
	Plenary session (9:00–10:15) – Statler Auditorium
09:00–09:25	<i>John Urschel</i> , Estimating the Numerical Range with a Krylov Subspace
09:25–09:50	<i>Heather Wilber</i> , A Time-Frequency Method for Acoustic Scattering in Unfriendly Domains
09:50–10:15	<i>Anna Yesypenko</i> , Randomized Algorithms for the Simultaneous Compression and LU Factorization of Hierarchical Matrices
10:15–11:00	Coffee Break and check out – Statler Atrium and Hotel
	Plenary session (11:00–11:50) – Statler Auditorium
11:00–11:25	<i>Roel Van Beeumen</i> , Quantum Krylov Methods for Eigenvalue Calculations
11:25–11:50	<i>Volker Mehrmann</i> , Regularization and stabilization of port-Hamiltonian descriptor systems via output feedback
11:50–12:00	Closing Remarks – Statler Ballroom
12:00–13:00	To-go lunch available – Statler Ballroom

Posters

- Michael S. Ackermann*, Leveraging Numerical Linear Algebra for Robust Learning of Optimal H2 models from time-domain data
- Robin Armstrong*, Collect, Commit, Expand: an Efficient Strategy for Column Subset Selection on Extremely Wide Matrices
- David S. Bindel*, Birkhoff Averages, Invariant Sets, and Adaptive Filtering
- Erik G Boman*, Parallel Incomplete Factorization Preconditioners
- Erin Carson*, The Stability of Split-Preconditioned FGMRES in Four Precisions
- Fei Chen*, Convergence Behavior of GMRES on Tridiagonal Toeplitz Systems
- Tyler Chen*, Preconditioning without a preconditioner: faster ridge-regression and Gaussian sampling with randomized block Krylov methods
- Edmond Chow*, Online Machine Learning for Solving a Sequence of Linear Systems
- Julianne Chung*, Efficient sample average approximation techniques for hyperparameter estimation in Bayesian inverse problems
- Alice Cortinovis*, Fast Randomized Column Subset Selection Using Strong Rank-revealing QR
- Anil Damle*, Rank-revealing QR factorizations: applications, algorithms, and theory
- James Demmel*, On Minimizing Arithmetic and Communication Complexity of Jacobi's Eigenvalue Method: Review and Beyond
- Yijun Dong*, Toward Fast and Provable Data Selection under Low Intrinsic Dimension
- Vladimir Druskin*, Nonlinear inverse scattering data transforms via casual transmutation matrices
- Malena I. Español*, Variable Projection Methods for Regularized Separable Nonlinear Inverse Problems
- Srinivas Eswar*, Bayesian Optimal Experiment Design via Column Subset Selection
- Paola Ferrari*, Multigrid Methods for Solving Indefinite Problems in Port-Hamiltonian Systems
- Isabella Furci*, Analysis on aggregation and block smoothers in multigrid methods for block structured linear systems
- Nithin Govindarajan*, Towards Efficient Algorithms for Approximately Solving (Overdetermined) Systems of Polynomial Equations
- Sophia Keip*, QCLAB: A MATLAB Toolbox for Quantum Numerical Linear Algebra
- Misha E. Kilmer*, A Memory-efficient MM-GKS Variant for Large-scale Dynamic or Streaming Inverse Problems
- Daniel Kressner*, Randomized solvers for joint eigenvalue problems
- Hei Yin Lam*, Randomized low-rank Runge-Kutta methods
- Rich Lehoucq*, Optimal accuracy for linear sets of equations with the graph Laplacian
- Ren-Cang Li*, The NPDo Approach For Optimization On The Stiefel Manifold with Applications
- Xiaobo Liu*, Mixed precision HODLR matrices
- Robert Luce*, A MATLAB Toolbox for Toeplitz-Like Matrix Computations
- Linjian Ma*, Efficient tensor network contraction algorithms
- Roummel Marcia*, Inverse Eigenvalue Difference Problems Arising in Quantum Sensing
- Karl Meerbergen*, Shift-and-invert Arnoldi for singular eigenvalue problems
- Agnieszka Międlar*, On the Convergence of the CROP-Anderson Acceleration Method
- Tim Mitchell*, Interpolation-Based Algorithms to Compute the H-infinity Norm of a Parametric System
- Uria Mor*, QUASITUBAL TENSOR Framework with APPLICATIONS TO MULTIWAY FUNCTIONAL DATA
- James Nagy*, Inverse Problems, Kronecker Products and Mixed Precision Computations
- Lucas Onisk*, Mixed Precision Iterative Refinement for Linear Inverse Problems
- Carolin Penke*, Using a Blocked Adaptive Randomized Range Finder to Reduce Memory Requirements in Deep Learning Based on the Householder QR Decomposition
- Vasilije Perović*, A hybrid method for computing a few singular triplets of very large sparse matrices
- Anshul Prajapati*, Optimizing Rayleigh quotient with symmetric constraints and its application to eigenvalue backward errors of polynomial and rational eigenvalue problems

Leonardo Robol, Preconditioned Low-Rank Riemannian Optimization for Symmetric Positive Definite Linear Matrix Equations
Michael Saunders, Algorithm NCL for constrained optimization: Solving the linear systems within interior methods
Nian Shao, Randomized small-block Lanczos for null space computations
Tianyi Shi, Data-parallel adaptive tensor-train cross approximation
Kirk M. Soodhalter, Filtration of Lanczos vectors in hybrid CG Tikhonov iteration
Martin Stoll, Adaptive rational Krylov methods for exponential Runge-Kutta integrators on networks
Christine Tobler, Quantum Computing in MATLAB
Alex Townsend, The Quest for a Numerically Stable Multivariate Polynomial Rootfinder
Christopher Wang, Surrogate-based Autotuning for Randomized Numerical Linear Algebra
Liron Mor Yosef, Efficient Classical-Quantum Algorithms for Matrix Encoding