Householder Symposium XXII

Cornell University, Ithaca

8 - 13 June 2025

Sunday

19:00–21:00	**Welcome Reception** – Statler Ballroom

Monday

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

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

Tuesday

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

14:20–14:45	*Xin Liang*, Stochastic algebraic Riccati equations are almost as easy as deterministic ones
14:45–15:10	*Sungwoo Jeong*, 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	*Santolo Leveque*, Fast Solvers for the Runge–Kutta Integration of the Instationary Incompressible Navier–Stokes Equations
16:05–16:30	*Ding Lu*, Convergence Analysis of SCF Iteration for Eigenvector-Dependent Nonlinear Eigenvalue Problems
16:30–16:55	*Mattia Manucci*, Solving generalized Lyapunov equations with guarantees: application to the reduction of linear switched systems
16:55–17:20	*Stefano Massei*, On the quasiseparability of the solution of continuous-time Riccati equations with quasiseparable coefficients
17:20–17:45	*Froilán Dopico*, Structured rational matrices: properties and strongly minimal linearizations
	Track B – Statler Hall 196
15:40–16:05	*Ron Morgan*, Krylov Methods and Polynomials
16:05–16:30	*Alexis Montoison*, MinAres: An Iterative Solver for Symmetric Linear Systems
16:30–16:55	*Keiichi Morikuni*, Block cross-interactive residual smoothing for Lanczos-type solvers for linear systems with multiple right-hand sides
16:55–17:20	*Yuxin Ma*, Backward stability of s-step GMRES
17:20–17:45	*Anna Ma*, Randomized Kaczmarz on doubly noisy systems and its applications
	Track C – Statler Hall 198
15:40–16:05	*Hengrui Luo*, Building Scalable Tensor Regression Models: Linear Solvers and Beyond
16:05–16:30	*D. Steven Mackey*, Sign Characteristic in the Inverse Problem for Hermitian Matrix Polynomials
16:30–16:55	*Maike Meier*, Exploiting mathematical structures in spectral imaging to accelerate experiments and improve iterative reconstructions
16:55–17:20	*Steffen W. R. Werner*, Structured Representations of Rational Functions for Learning Mechanical Dynamical Systems: A Barycentric Approach
17:20–17:45	*Zlatko Drmač*, 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	*Cleve Moler*, A Million-Dollar Matrix
09:25–09:50	*Elizabeth Newman*, Optimal Matrix-Mimetic Tensor Algebras
09:50–10:15	*Vanni Noferini*, 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	*Eda Oktay*, Recent Advances in Mixed-Precision (Hybrid) Iterative Methods
11:10–11:35	*Elizabeth Qian*, The Fundamental Subspaces of Ensemble Kalman Inversion
11:35–12:00	*Malena Sabaté Landman*, 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
	Plenary session (9:00–10:45) – Statler Auditorium
09:00–09:25	*Ryan Schneider*, Symmetric Pseudospectral Shattering and Fast Divide-and-Conquer for the Definite Generalized Eigenvalue Problem
09:25–09:50	*Jemima M. Tabeart*, Preconditioning Weak-Constraint 4D-Var: A Parallelisable Implementation in Firedrake
09:50–10:15	*Françoise Tisseur*, Computing Accurate Eigenvalues of Symmetric Matrices With a Mixed Precision Jacobi Algorithm
10:15–10:40	*Lloyd N. Trefethen*, From Zolotarev problems in linear algebra to a new approach to quadrature
10:40–11:10	**Coffee Break** – Statler Atrium
	Parallel session (11:10–12:00)
	Track A – Statler Auditorium
11:10–11:35	*Andrew J. Higgins*, Randomized Householder-Cholesky QR Factorization with Multisketching
11:35–12:00	*Yuji Nakatsukasa*, A fast algorithm for low-rank approximation with error control
	Track B – Statler Hall 196
11:10–11:35	*Esmond G. Ng*, Recent Results on Improving Performance of Sparse Cholesky Factorization by Reordering Columns within Supernodes
11:35–12:00	*Michal Outrata*, Absorbing boundary conditions form Padé approximants (sometimes): continued fractions are the key
	Track C – Statler Hall 198
11:10–11:35	*Jan Papež*, Error estimate and stopping criteria for least-squares problems solved by CG-like algorithms CGLS and LSQR
11:35–12:00	*Taejun Park*, AdaCUR: Efficient Low-rank Approximation of Parameter-dependent matrices A(t) via CUR decomposition
12:00–13:30	**Lunch Break** – Statler Ballroom
	Parallel session (13:30–15:10)
	Track A – Statler Auditorium
13:30–13:55	*Mirjeta Pasha*, Efficient Dynamic Image Reconstruction with Motion Estimation
13:55–14:20	*John W. Pearson*, Fast Iterative Solvers for Optimization of Nonlocal PDEs
14:20–14:45	*David Persson*, Randomized Nyström approximation of non-negative self-adjoint operators
14:45–15:10	*John Peca-Medlin*, Global and local growth behavior of GEPP and GECP
	Track B – Statler Hall 196
13:30–13:55	*Elizaveta Rebrova*, On efficiency and adaptivity of sketch-and-project approach in randomized linear solvers
13:55–14:20	*Stefano Pozza*, Matrix equations from the $\star$-algebra with quantum chemistry applications
14:20–14:45	*Bor Plestenjak*, A Randomized Numerical Method for Joint Eigenvalues of Commuting Matrices
14:45–15:10	*Michele Rinelli*, Analysis of Stochastic Probing Methods for Estimating the Trace of Functions of Sparse Symmetric Matrices
	Track C – Statler Hall 198
13:30–13:55	*Rikhav Shah*, Sparse Pseudospectral Shattering
13:55–14:20	*Igor Simunec*, Estimation of Spectral Gaps for Sparse Symmetric Matrices
14:20–14:45	*Navjot Singh*, Alternating Mahalanobis Distance Minimization for CP Tensor Decomposition
14:45–15:10	*Aleksandros Sobczyk*, 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	*Nicole Spillane*, GMRES with Preconditioning, Weighted norm and Deflation
16:05–16:30	*Andreas Stathopoulos*, Evaluating and improving streaming methods for large scale SVD problems
16:30–16:55	*Jianlin Xia*, Matrix Analysis and Fast Solvers for Neural Network Computations
16:55–17:20	*Ning Zheng*, Iterative Methods for Sylvester-like Variational Inequality Problems
17:20–17:45	*André Uschmajew*, Accelerating operator Sinkhorn iteration with overrelaxation
	Track B – Statler Hall 196
15:40–16:05	*Niel Van Buggenhout*, Numerically generating Sobolev orthogonal polynomials
16:05–16:30	*Bart Vandereycken*, Spectral problems through the lens of optimization: new ideas and improved algorithms?
16:30–16:55	*Wim Vanroose*, Subspace methods with asymptotic Krylov convergence for bounded variable problems.
16:55–17:20	*David S. Watkins*, Bulge Chasing is Pole Swapping
17:20–17:45	*Yuanzhe Xi*, Data-driven Numerical Methods for Kernel Matrices
	Track C – Statler Hall 198
15:40–16:05	*Xiaobai Sun*, Sparsify Latent Factor Matrix by Householder Transformations
16:05–16:30	*Fei Xue*, A block conjugate gradient method with polynomial filters for symmetric eigenvalue problems: practice and global quasi-optimality
16:30–16:55	*Mikhail Zaslavskiy*, Adaptive data-driven reduced-order models of port-Hamiltonian dynamical systems for nonlinear inverse scattering applications
16:55–17:20	*Jörn Zimmerling*, Monotonicity, Bounds, and Averaging of Block-Gauss and Gauss-Radau Quadrature for Computing $B^T f(A)B$
17:20–17:45	*Frank Uhlig*, 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	*John Urschel*, Estimating the Numerical Range with a Krylov Subspace
09:25–09:50	*Heather Wilber*, A Time-Trequency Method for Acoustic Scattering in Unfriendly Domains
09:50–10:15	*Anna Yesypenko*, 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	*Roel Van Beeumen*, Quantum Krylov Methods for Eigenvalue Calculations
11:25–11:50	*Volker Mehrmann*, 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: Applications to Multiway Functional Data Analysis
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