



UNIVERSITAT  
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2012 SIAM Conference on  
Applied Linear Algebra  
SIAM June 18<sup>th</sup> - 22<sup>nd</sup>

**Thursday, June 21**  
**Room: Plenary Room**

9:00–9:45		SIAG/LA prize award ceremony
10:10–10:55	IP 9	<i>Solving nonlinear eigenvalue problems in electronic structure calculation</i> Chao Yang (Chair: Eric de Sturler)
11:00–12:40	MS 56	<i>Eigenvalue perturbations and pseudospectra - Part I of II</i> Organizer: Daniel Kressner and Julio Moro
	11:00–11:25	<i>Inclusion theorems for pseudospectra of block triangular matrices</i> Michael Karow
	11:25–11:50	<i>Conjectures on pseudospectra of matrices</i> Juan-Miguel Gracia
	11:50–12:15	<i>Sensitivity of eigenvalues of an unsymmetric tridiagonal matrix</i> Carla Ferreira
	12:15–12:40	<i>First order structured perturbation theory for eigenvalues of skew-adjoint matrices</i> Julio Moro
14:10–14:55	IP 10	<i>Randomized algorithms in linear algebra</i> Petros Drineas (Chair: Chen Greif)
15:00–16:40	MS 64	<i>Eigenvalue perturbations and pseudospectra - Part II of II</i> Organizer: Daniel Kressner and Julio Moro
	15:00–15:25	<i>Ritz value localization for non-Hermitian matrices</i> Marc Embree
	15:25–15:50	<i>Optimization of eigenvalues of Hermitian matrix functions</i> Emre Mengi
	15:50–16:15	<i>Algorithms for approximating the H1 norm</i> Michael Overton
	16:15–16:40	<i>Reduced basis methods for computing pseudospectral quantities</i> Daniel Kressner
17:00–18:40	CP 38	<i>Eigenvalue problems IV</i>
	17:00–17:25	<i>An efficient way to compute the eigenvalues in a specific region of complex plane</i> E. Fatih Yetkin
	17:25–17:50	<i>A divide, reduce and conquer algorithm for matrix diagonalization in computer simulators</i> Marios Iakovidis
	17:50–18:15	<i>A rational Krylov method based on Newton and/or Hermite interpolation for the nonlinear eigenvalue problem</i> Roel Van Beeumen
	18:15–18:40	<i>The rotation of eigenspaces of perturbed matrix pairs</i> Ninoslav Truhar



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**Room: 2.0**

11:00–12:40	MS 51	<i>Accurate and verified numerical computations for numerical linear algebra</i> Organizer: Takeshi Ogita and Siegfried M. Rump
	11:00–11:25	<i>Product decomposition and its applications</i> Naoya Yamanaka
	11:25–11:50	<i>The MPACK: multiple precision version of BLAS and LAPACK</i> Maho Nakata
	11:50–12:15	<i>On eigenvalue computations of nonderogatory matrices</i> Aurél Galántai
	12:15–12:40	<i>Verified solutions of sparse linear systems</i> Takeshi Ogita



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**Room: 2.8**

11:00–12:40	<b>MS 52</b>	<i>Numerical linear algebra libraries for high end computing - Part I of II</i> Organizer: L. A. Drummond, Nahid Emad and Jose E. Roman
	11:00–11:25	<i>Large-scale eigenvalue computation with PETSc and YML</i> Makarem Dandouna
	11:25–11:50	<i>Sparse matrix-matrix operations in PETSc</i> Hong Zhang
	11:50–12:15	<i>Hierarchical QR factorization algorithms for multi-core cluster systems</i> Julien Langou
	12:15–12:40	<i>Towards robust numerical algorithms for exascale simulation</i> Emmanuel Agullo
15:00–16:40	<b>MS 60</b>	<i>Numerical linear algebra libraries for high end computing - Part II of II</i> Organizer: L. A. Drummond, Nahid Emad and Jose E. Roman
	15:00–15:25	<i>Thick-restart Lanczos methods for symmetric-indefinite generalized eigenproblems in SLEPc</i> Jose E. Roman
	15:25–15:50	<i>Parametric approach to smart-tuning and auto-tuning of the DOE ACTS collection</i> L. A. (Tony) Drummond
	15:50–16:15	<i>Trilinos: foundational libraries that enable next-generation computing</i> Heidi Thornquist
	16:15–16:40	<i>Rethinking distributed dense Linear Algebra</i> Jack Poulson
17:00–18:40	<b>CP 40</b>	<i>Control systems III</i>
	17:00–17:25	<i>H<sub>2</sub> approximation of linear time-varying systems</i> Samuel Melchior
	17:25–17:50	<i>Analysis of behaviour of the eigenvalues and eigenvectors of singular linear systems</i> Sonia Tarragona
	17:50–18:15	<i>Stabilization of controllable planar bimodal linear systems</i> Marta Peña
	18:15–18:40	<i>A combinatorial approach to feedback equivalence of linear systems</i> Miguel V. Carriegos



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**Thursday, June 21**

**Room: 2.12**

11:00–12:40	<b>MS 53</b>	<i>Efficient preconditioners for real world applications - Part I of II</i> Organizer: Massimiliano Ferronato, Carlo Janna and Luca Bergamaschi
	11:00–11:25	<i>A parallel factored preconditioner for non-symmetric linear systems</i> Carlo Janna
	11:25–11:50	<i>Preconditioning for linear least-squares problems</i> Miroslav Tůma
	11:50–12:15	<i>Robust and parallel preconditioners for mechanical problems</i> Kees Vuik
	12:15–12:40	<i>Block factorized forms of SPAI</i> Thomas Huckle
15:00–16:40	<b>MS 61</b>	<i>Efficient preconditioners for real world applications - Part II of II</i> Organizer: Massimiliano Ferronato, Carlo Janna and Luca Bergamaschi
	15:00–15:25	<i>Relaxed mixed constraint preconditioners for ill-conditioned symmetric saddle point linear systems</i> Luca Bergamaschi
	15:25–15:50	<i>Chebyshev acceleration of iterative refinement</i> Jennifer Scott
	15:50–16:15	<i>Parallel deflated GMRES with the Newton basis</i> Désiré Nuentza Wakam
	16:15–16:40	<i>Rank-k updates of incomplete Sherman-Morrison preconditioners</i> José Marín
17:00–18:40	<b>CP 35</b>	<i>Matrix equations</i> <span style="color: red;">Chair: Bruno Carpentieri</span>
	17:00–17:25	<i>Upper bounds on the solution of the continuous algebraic Riccati matrix equation</i> Zübeyde Ulukök
	17:25–17:50	<i>A stable variant of the biconjugate A-orthogonal residual method for non-Hermitian linear systems</i> Bruno Carpentieri
	17:50–18:15	<i>On Hermitian and skew-Hermitian splitting iteration methods for the equation <math>AXB = C</math></i> Xiang Wang
	18:15–18:40	<i>A large-scale nonsymmetric algebraic Riccati equation from transport theory</i> Hung-Yuan Fan

Moved to MS 46



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**Thursday, June 21**

**Room: 2.13**

11:00–12:40	<b>MS 54</b>	<i>Solving ill-posed systems via signal-processing techniques - Part I of II</i> Organizer: Stephen Becker and Dirk Lorenz
	11:00–11:25	<i>Sequential updates for L1 minimization: sparse Kalman filtering, reweighted L1, and more</i> Justin Romberg
	11:25–11:50	<i>Solving basis pursuit: infeasible-point subgradient algorithm, computational comparison, and improvements</i> Andreas Tillmann
	11:50–12:15	<i>Semismooth Newton methods with multi-dimensional filter globalization for <math>l_1</math> optimization</i> Andre Milzarek
	12:15–12:40	<i>Improved first-order methods: how to handle constraints, non-smoothness, and slow convergence</i> Stephen Becker
15:00–16:40	<b>MS 62</b>	<i>Solving ill-posed systems via signal-processing techniques - Part II of II</i> Organizer: Stephen Becker and Dirk Lorenz
	15:00–15:25	<i>Effects of prox parameter selection strategies in exact and inexact first-order methods for compressed sensing and other composite optimization problems</i> Katya Scheinberg
	15:25–15:50	<i>An adaptive inverse scale space method for compressed sensing</i> Martin Benning
	15:50–16:15	<i>CGSO for convex problems with polyhedral constraint</i> Sahar Karimi
	16:15–16:40	<i>Phase-retrieval using explicit low-rank matrix factorization</i> Ewout van den Berg
17:00–18:40	<b>CP 37</b>	<i>Matrix computations</i>
	17:00–17:25	<i>Computation of the matrix <math>p</math>th root and its Fréchet derivative by integrals</i> Joao R. Cardoso
	17:25–17:50	<i>An algorithm for the exact Fisher information matrix of vector ARMAX time series processes</i> André Klein
	17:50–18:15	<i>An algorithm to compute the matrix logarithm and its Fréchet derivative for use in condition number estimation</i> Samuel Relton
	18:15–18:40	<i>High-order iterative methods for the matrix <math>p</math>th root</i> Sergio Amat



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**Room: 2.9**

11:00–12:40	<b>MS 55</b>	<i>Max-algebra - Part I of II</i> Organizer: Hans Schneider and Peter Butkovic
	11:00–11:25	<i>Tropical bounds for the eigenvalues of structured matrices</i> Marianne Akian
	11:25–11:50	<i>Sensitivity in extremal systems of linear equations and inequalities</i> Karel Zimmermann
	11:50–12:15	<i>Multiplicative structure of tropical matrices</i> Mark Kambites
	12:15–12:40	<i>Transience bounds for matrix powers in max algebra</i> Sergei Sergeev
15:00–16:40	<b>MS 63</b>	<i>Max-algebra - Part II of II</i> Organizer: Hans Schneider and Peter Butkovic
	15:00–15:25	<i>Three-dimensional convex polyhedra tropically spanned by four points</i> María Jesús de la Puente
	15:25–15:50	<i>Algorithmic problems in tropical convexity</i> Martin Benning
	15:50–16:15	<i>On the weak robustness of interval fuzzy matrices</i> Ján Plávka
	16:15–16:40	<i>Weakly stable matrices</i> Peter Butkovic
17:00–18:40	<b>CP 42</b>	<i>Multigrid II</i>
	17:00–17:25	<i>Adaptive smoothed aggregation multigrid for nonsymmetric matrices</i> Marcel Schweitzer
	17:25–17:50	<i>Local Fourier analysis for multigrid methods on semi-structured triangular grids</i> Carmen Rodrigo
	17:50–18:15	<i>Approach for accelerating the convergence of multigrid methods using extrapolation methods</i> Sebastien Duminil
	18:15–18:40	<i>Algebraic multigrid (AMG) for saddle point systems</i> Bram Metsch



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**Room: 2.11**

11:00–12:40	<b>MS 57</b>	<i>Numerical linear algebra and optimization in imaging applications - Part I of II</i> Organizer: Julianne Chung and Roummel Marcia
	11:00–11:25	<i>Some numerical linear algebra and optimization problems in spectral Imaging</i> Robert Plemmons
	11:25–11:50	<i>Image restoration via constrained optimization: an approach using feasible direction methods</i> Germana Landi
	11:50–12:15	<i>On the solution of linear systems in Newton-type methods for image reconstruction</i> Elena Piccolomini
	12:15–12:40	<i>Alternating direction optimization for convex inverse problems with application to imaging and hyperspectral unmixing</i> Jose Bioucas-Dias
15:00–16:40	<b>MS 65</b>	<i>Numerical linear algebra and optimization in imaging applications - Part II of II</i> Organizer: Julianne Chung and Roummel Marcia
	15:00–15:25	<i>A recursion relation for solving L-BFGS systems with diagonal updates</i> Jennifer Erway
	15:25–15:50	<i>Wavefront gradients reconstruction using <math>l^1 - l^p</math> models</i> Raymond Chan
	15:50–16:15	<i>Edge-preserving image enhancement via blind deconvolution and upsampling operators</i> Antonio Marquina
	16:15–16:40	<i>Spatio-temporal compressed sensing with coded apertures and keyed exposures</i> Roummel F. Marcia
17:00–18:40	<b>CP 36</b>	<i>Positivity II</i>
	17:00–17:25	<i>A note on B-matrices and doubly B-matrices</i> C. Mendes Araújo
	17:25–17:50	<i>Accurate computations for rational Bernstein-Vandermonde and Said-Ball-Vandermonde matrices</i> Jorge Delgado
	17:50–18:15	<i>On properties of combined matrices</i> Isabel Giménez
	18:15–18:40	<i>Computing the Jordan blocks of irreducible totally nonnegative matrices</i> Plamen Koev

New talk





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**Room: A**

11:00–12:40	<b>MS 58</b>	<i>Parametric eigenvalue problems - Part I of II</i> Organizer: K. Meerbergen, W. Michiels and C. Lecomte
	11:00–11:25	<i>Computing double eigenvalues via the two-parameter eigenvalue problem</i> Bor Plestenjak
	11:25–11:50	<i>Lyapunov inverse iteration for identifying Hopf bifurcations in models of incompressible flow</i> Alastair Spence
	11:50–12:15	<i>A quadratically convergent algorithm for matrix distance problems</i> Melina Freitag
	12:15–12:40	<i>A real Jacobi-Davidson algorithm for the 2-real-parameter eigenvalue problema</i> Christian Schröder
15:00–16:40	<b>MS 66</b>	<i>Parametric eigenvalue problems - Part II of II</i> Organizer: K. Meerbergen, W. Michiels and C. Lecomte
	15:00–15:25	<i>A subspace optimization technique for the generalized minimal maximal eigenvalue problema</i> Jeroen De Vlieger
	15:25–15:50	<i>An iterative method for computing pseudospectral abscissa and stability radii for nonlinear eigenvalue problems</i> Wim Michiels
	15:50–16:15	<i>Statistical pseudospectrum and eigenvalue robustness to rank-one disturbance</i> Christophe Lecomte
	16:15–16:40	
17:00–18:40	<b>CP 34</b>	<i>PageRank</i>
	17:00–17:25	<i>Optimization of the HOTS score of a website's pages</i> Olivier Fercoq
	17:25–17:50	<i>An inclusion set for the personalized PageRank</i> Francisco Pedroche
	17:50–18:15	<i>The effect of coherence on sampling from matrices with orthonormal columns, and preconditioned least squares problems</i> Thomas Wentworth
	18:15–18:40	

New talk





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**Room: 2.15**

11:00–12:40	<b>MS 59</b>	<i>Structured matrix computations - Part I of II</i> Organizer: Jianlin Xia and Xiaoye S. Li
	11:00–11:25	<i>Factorization of <math>H^2</math>-matrices</i> Steffen Börm
	11:25–11:50	<i>The polynomial root finding problems and quasiseparable representations of unitary matrices</i> Yuli Eidelman
	11:50–12:15	<i>A fast direct solver for structured matrices arising from non-oscillatory integral equations</i> Kenneth L. Ho
	12:15–12:40	<i>Multivariate orthogonal polynomials and inverse eigenvalue problem</i> Matthias Humet
15:00–16:40	<b>MS 67</b>	<i>Structured matrix computations - Part II of II</i> Organizer: Jianlin Xia and Xiaoye S. Li
	15:00–15:25	<i>Randomized numerical matrix computations with applications</i> Victor Pan
	15:25–15:50	<i>Massively parallel structured direct solver for the equations describing time-harmonic seismic waves</i> Maarten V. de Hoop
	15:50–16:15	<i>Accelerating electronic structure calculation with pole expansion plus selected inversion method</i> Lin Lin
	16:15–16:40	<i>Randomized direct solvers</i> Jianlin Xia
17:00–18:40	<b>CP 41</b>	<i>Miscellaneous V</i>
	17:00–17:25	<i>Randomized distributed matrix computations based on gossiping</i> Wilfried N. Gansterer
	17:25–17:50	<i>A tabular methodology for matrix Padé approximants with minimal row degrees</i> Celina Pestano-Gabino
	17:50–18:15	<i>Sublinear randomized algorithms for skeleton decompositions</i> Jiawei Chiu
	18:15–18:40	<i>Preconditioners for strongly non-symmetric linear Systems</i> Lev Krukier



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**Room: B**

17:00–18:40	CP 39	<i>Probabilistic equations</i>
	17:00–17:25	<i>Banded structures in probabilistic evolution equations for ODEs</i> Fatih Hunutlu
	17:25–17:50	<i>Space extensions in the probabilistic evolution equations of ODEs</i> Ercan Gürvit
	17:50–18:15	<i>Triangularity and conicality in probabilistic evolution equations for ODEs</i> Metin Demiralp
	18:15–18:40	