Julien Langou **Date: February 10th, 2014**

http://www.math.ucdenver.edu/~langou/

1 Education

Ph.D. in Applied Mathematics, National Institute of Applied Sciences (INSA); Toulouse, France (2003). Thesis Advisor: Luc Giraud. Thesis Title: *Iterative solvers for linear systems with multiple right-hand sides*.

M.S. in Applied Mathematics, University Paul Sabatier Toulouse; Toulouse, France (1999)

M.S. in Propulsion Engineering, Supaéro (National School of Engineering in Aeronautic and Space); Toulouse, France (1999)

2 Professional Experience

Associate Professor, (tenure,) Department of Mathematical and Statistical Sciences, University of Colorado Denver (Jun. 2011-Present)

Assistant Professor, (tenure-track,) Department of Mathematical and Statistical Sciences, University of Colorado Denver (Aug. 2006-Jun. 2011)

Research Scientist and Adjunct Assistant Professor, Computer Science Department, University of Tennessee (Jan. 2005-Aug. 2006)

Research Assistant, Computer Science Department, University of Tennessee (Oct. 2003-Dec. 2004)

Ph.D. Student, Parallel Algorithm Project, CERFACS, Toulouse France (Oct. 1999-Oct. 2003)

3 Publications

3.1 Refereed Publications

2013 Jack Dongarra, Mathieu Faverge, Thomas Herault, Mathias Jacquelin, Julien Langou, and Yves Robert. Hierarchical QR factorization algorithms for multi-core cluster systems. *Parallel Computing*, 39(4-5):212–232, 2013. DOI information: 10.1016/j.parco.2013.01.003

2013 Fred G. Gustavson, Jerzy Waśniewski, Jack J. Dongarra, José R. Herrero, and Julien Langou. Level-3 Cholesky factorization routines improve performance of many Cholesky algorithms. *ACM Transactions on Mathematical Software*, 39(2), February 2013. DOI information: 10.1145/2427023.242702r64

2012 Henri Calandra, Serge Gratton, Julien Langou, Xavier Pinel, and Xavier Vasseur. Flexible Variants of Block Restarted GMRES Methods with Application to Geophysics. *SIAM J. Scientific Computing*, 34(2):A714–A736, 2012.

2012 James Demmel, Laura Grigori, Mark Hoemmen, and Julien Langou. Communication-optimal parallel and sequential QR and LU factorizations. *SIAM J. Scientific Computing*, 34(1):A206–A239, 2012.

2011 Emmanuel Agullo, Camille Coti, Thomas Herault, Julien Langou, Sylvain Peyronnet, Ala Rezmerita, Franck Cappello, and Jack Dongarra. QCG-OMPI: MPI Applications on Grids. *Future Generation Computer Systems*, 27(4):357–369, 2011.

2011 Eugene Vecharynski and Julien Langou. Any admissible cycle-convergence behavior is possible for restarted GMRES at its initial cycles. *Numerical Linear Algebra with Applications*, 18(3):499–511, 2011.

2010 Fred G. Gustavson, Jerzy Waśniewski, Jack J. Dongarra, and Julien Langou. Rectangular full packed format for Cholesky's algorithm: Factorization, solution and inversion. *ACM Trans. Math. Software*, 37(2):1–21, 2010.

2010 Eugene Vecharynski and Julien Langou. The cycle-convergence of restarted GMRES for normal matrices is sublinear. *SIAM J. Scientific Computing*, 32(1):186–196, 2010.

2009 Marc Baboulin, Alfredo Buttari, Jack Dongarra, Jakub Kurzak, Julie Langou, Julien Langou, Piotr Luszczek, and Stanimire Tomov. Accelerating scientific computations with mixed precision algorithms. *Computer Physics Communications*, 180:2526–2533, 2009.

2009 Marc Baboulin, Jack Dongarra, Serge Gratton, and Julien Langou. Computing the conditioning of the components of a linear least squares solution. *Numerical Linear Algebra and its Applications*, 16(7):517–533, July 2009.

2009 Jack Dongarra and Julien Langou. The problem with the Linpack benchmark matrix generator. *International Journal of High Performance Computing Applications*, 23(1):5–13, 2009.

2009 George Bosilca, Rémi Delmas, Jack Dongarra, and Julien Langou. Algorithm-based fault tolerance applied to high performance computing. *J. Parallel Distrib. Comput.*, 69:410–416, 2009.

2009 Alfredo Buttari, Julien Langou, Jakub Kurzak, and Jack Dongarra. A class of parallel tiled linear algebra algorithms for multicore architectures. *Parallel Computing*, 35:38–53, 2009.

2009 Marc Baboulin, Luc Giraud, Serge Gratton, and Julien Langou. Parallel tools for solving incremental dense least squares problems: application to space geodesy. *J. of Algorithms & Computationnal Technology*, 3(1):117–133, December 2009.

2008 Alfredo Buttari, Julien Langou, Jakub Kurzak, and Jack Dongarra. Parallel tiled QR factorization for multicore architectures. *Concurrency Computat.: Pract. Exper.*, 20(13):1573–1590, September 2008.

2007 Alfredo Buttari, Jack Dongarra, Julie Langou, Julien Langou, Piotr Luszczek, and Jakub Kurzak. Mixed precision iterative refinement techniques for the solution of dense linear systems. *International Journal of High Performance Computing Applications*, 21(4):457–466, 2007.

2007 Alfredo Buttari, Victor Eijkhout, Julien Langou, and Salvatore Filippone. Performance optimization and modeling of blocked sparse kernels. *International Journal of High Performance Computing Applications*, 21(4):467–484, 2007.

2007 Julien Langou, Zizhong Chen, George Bosilca, and Jack Dongarra. Recovery patterns for iterative methods in a parallel unstable environment. *SIAM J. Scientific Computing*, 30(1):102–116, 2007.

2007 Marc Baboulin, Serge Gratton, Luc Giraud, and Julien Langou. A distributed packed storage for large parallel calculations. *Concurrency and Computation: Practice and Experience*, 19(4):483–502, March 2007.

2007 Luc Giraud, Serge Gratton, and Julien Langou. Convergence in backward error of relaxed GMRES. *SIAM J. Scientific Computing*, 29(2):710–728, April 2007.

2006 Alicja Smoktunowicz, Jesse L. Barlow, and Julien Langou. A note on the error analysis of classical Gram-Schmidt. *Numerische Mathematik*, 105(2):299–313, December 2006.

2006 Stanimire Tomov, Julien Langou, Jack Dongarra, Andrew Canning, and Lin-Wang Wang. Conjugate-gradient eigenvalue solvers in computing electronic properties of nanostructure architectures. *Int. J. Computational Science and Engineering*, 2(3/4):205–212, 2006.

2006 Luc Giraud, Julien Langou, and Guillaume Sylvand. On the parallel solution of large industrial wave propagation problems. *Journal of Computational Acoustics*, 14(1):83–111, March 2006.

2006 George Bosilca, Zizhong Chen, Jack Dongarra, Victor Eijkhout, Graham E. Fagg, Erika Fuentes, Julien Langou, Piotr Luszczek, Jelena Pjesivac-Grbovic, Keith Seymour, Haihang You, and Satish S. Vadiyar. Self Adapting Numerical Software (SANS) Effort. *IBM Journal of Research and Development*, 50(2/3):223–238, 2006.

2005 Luc Giraud, Julien Langou, and Miroslav Rozložník. On the loss of orthogonality in the Gram-Schmidt orthognalization process. *Computers and Mathematics with Applications*, 50:1069–1075, 2005.

2005 Luc Giraud, Julien Langou, Miroslav Rozložník, and Jasper van den Eshof. Rounding error analysis of the classical Gram-Schmidt orthogonalization process. *Numerische Mathematik*, 101(1):87–100, July 2005.

2005 Valérie Frayssé, Serge Gratton, Luc Giraud, and Julien Langou. Algorithm 842: A set of GMRES routines for real and complex arithmetics on high performance computers. *ACM Trans. Math. Software*, 31(2):228–238, June 2005.

2005 Iain S. Duff, Luc Giraud, Julien Langou, and Émeric Martin. Using spectral low rank preconditioners for large electromagnetic calculations. *Int. J. Numerical Methods in Engineering*, 62(3):416–434, 2005.

2004 Luc Giraud, Serge Gratton, and Julien Langou. A rank-k update procedure for reorthogonalizing the orthogonal factor from modified Gram-Schmidt. *SIAM J. Matrix Analysis and Applications*, 25(4):1163–1177, August 2004.

2003 Luc Giraud and Julien Langou. A robust criterion for the modified Gram-Schmidt algorithm with selective reorthogonalization. *SIAM J. Scientific Computing*, 25(2):417–441, November 2003.

2002 Luc Giraud and Julien Langou. When modified Gram-Schmidt generates a well-conditioned set of vectors. *IMA J. Numerical Analysis*, 22:521–528, October 2002.

3.2 Publications in Refereed Symposia Proceedings

2014 Mathieu Faverge, Julien Herrmann, Julien Langou, Bradley Lowery, Yves Robert, and Jack Dongarra. Designing LU-QR hybrid solvers for performance and stability. In *IPDPS 14. The IEEE International Parallel & Distributed Processing Symposium 2014, Phoenix, Arizona, USA, May 19-23*, 2014.

2012 Jack Dongarra, Mathieu Faverge, Thomas Herault, Julien Langou, and Yves Robert. Hierarchical QR factorization algorithms for multi-core cluster systems. In *the Proceedings of IEEE International Parallel & Distributed Processing Symposium 2012 (IPDPS'12), 2012*.

2011 Henricus Bouwmeester, Mathias Jacquelin, Julien Langou, and Yves Robert. Tiled QR factorization algorithms. In *ACM/IEEE SC 2011 Conference (SC'11)*, November 2011.

2011 Emmanuel Agullo, Cédric Augonnet, Jack Dongarra, Mathieu Faverge, Julien Langou, Hatem Ltaief, and Stanimire Tomov. LU factorization for accelerator-based systems. In *the 9th ACS/IEEE International Conference on Computer Systems and Applications (AICCSA 11), Sharm El-Sheikh, Egypt, June 27-30, 2011*. (Best Paper Award of the Conference.)

2011 George Bosilca, Aurélien Bouteiller, Anthony Danalis, Mathieu Faverge, Azzam Haidar, Thomas Herault, Jakub Kurzak, Julien Langou, Pierre Lemarinier, Hatem Ltaief, Piotr Luszczek, Asim YarKhan, and Jack Dongarra. Flexible development of dense linear algebra algorithms on massively parallel architectures with DPLASMA. In *the 12th IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing, Anchorage (PDSEC-11), Alaska, USA, May 16-20, 2011*.

2010 Emmanuel Agullo, Henricus Bouwmeester, Jack Dongarra, Jakub Kurzak, Julien Langou, and Lee Rosenberg. Towards an efficient tile matrix inversion of symmetric positive definite matrices on multicore architectures. In *the Proceedings of 9th International Meeting on High Performance Computing for Computational Science (VecPar'10), Berkeley, CA, USA, June 22-25, 2010*. (Best Student Paper Award of the Conference.)

2010 Emmanuel Agullo, Camille Coti, Jack Dongarra, Thomas Herault, and Julien Langou. QR factorization of tall and skinny matrices in a grid computing environment. In *the Proceedings of IEEE International Parallel & Distributed Processing Symposium 2010 (IPDPS'10), Atlanta, GA, USA, April 19-23, 2010*.

2009 Emmanuel Agullo, Jim Demmel, Jack Dongarra, Bilel Hadri, Jakub Kurzak, Julien Langou, Haitem Ltaief, Piotr Luszczek, and Stanimire Tomov. Numerical linear algebra on emerging architectures: The PLASMA and MAGMA projects. In *Journal of Physics: Conference Series* 180 012037, (5 pages), 2009.

2008 Andrew Canning, Jack Dongarra, Julien Langou, Osni Marques, Stanimire Tomov, Christof Vömel, and Lin-Wang Wang. Interior state computation of nano structures. In *the Proceedings of workshop on state-of-the-art in scientific and parallel computing (Para08). Springer's Lecture Notes in Computer Science*.

2008 Marc Baboulin, Jack Dongarra, Serge Gratton, and Julien Langou. Computing the conditioning of the components of a linear least squares solution. In *the Proceedings of VECPAR '08, High Performance Computing for Computational Science, Toulouse, France, June 24-27*, 2008.

2007 Alfredo Buttari, Jack Dongarra, Jakub Kurzak, Julien Langou, Piotr Luszczek, and Stanimire Tomov. The impact of multicore on math software. In *the Proceedings of workshop on state-of-the-art in scientific and parallel computing (Para06). Springer's Lecture Notes in Computer Science 4699*, pages 1–10, Umeå, Sweden, 2007.

2007 Alfredo Buttari, Julien Langou, Jakub Kurzak, and Jack Dongarra. Parallel tiled QR factorization for multicore architectures. In *the Proceedings of PPAM07. Springer's Lecture Notes in Computer Science 4967*, pages 639–648, 2008.

2007 James Demmel, Jack Dongarra, Beresford Parlett, William Kahan, Ming Gu, David Bindel, Yozo Hida, Xiaoye Li, Osni Marques, E. Jason Riedy, Christof Voemel, Julien Langou, Piotr Luszczek, Jakub Kurzak, Alfredo Buttari, Julie Langou, and Stanmire Tomov. Prospectus for the next LAPACK and ScaLAPACK libraries. In *the Proceedings of workshop on state-of-the-art in scientific and parallel computing (Para06). Springer's Lecture Notes in Computer Science 4699*, pages 11–23, Umeå, Sweden, 2007.

2006 Alex Zunger, Alberto Franceschetti, Gabriel Bester, Wesley B. Jones, Kwiseon Kim, Peter A. Graf, Ling-Wang Wang, Andrew Canning, Osni Marques, Christof Voemel, Jack Dongarra, Julien Langou, and Stanimire Tomov. Predicting the electronic properties of 3D, million-atom semiconductor nanostructure architectures. In *Journal of Physics: Conference Series*, volume 46, pages 292–298, 2006.

2006 Julie Langou, Julien Langou, Piotr Luszczek, Jakub Kurzak, Alfredo Buttari, and Jack Dongarra. Exploiting the performance of 32 bit floating point arithmetic in obtaining 64 bit accuracy (revisiting iterative refinement for linear systems). In *ACM/IEEE SC 2006 Conference (SC'06)*, page 50, November 2006.

2005 Julien Langou, George Bosilca, Graham Fagg, and Jack Dongarra. Hash functions for datatype signatures in MPI. In B. Di Martino et al., editor, *the Proceedings of EuroPVM/MPI, Springer's Lecture Notes in Computer Science 3666*, pages 76–83, Sorrento, Italy, September 2005.

2005 Wesley B. Jones, Gabriel Bester, Andrew Canning, Alberto Franceschetti, Peter A. Graf, Kwiseon Kim, Julien Langou, Lin-Wang Wang, Jack Dongarra, and Alex Zunger. NanoPSE: A nanoscience problem solving environment for atomistic electronic structure of semiconductor nanostructures. In *Journal of Physics: Conference Series*, volume 16, pages 277–282, 2005.

2005 Zizhong Chen, Graham E. Fagg, Edgar Gabriel, Julien Langou, Thara Angskun, George Bosilca, and Jack Dongarra. Building fault survivable MPI programs with FT-MPI using diskless-checkpointing. In *the Proceedings of the tenth ACM SIGPLAN symposium on Principles and Practice of Parallel Programming (PPoPP)*, pages 213–223, Chicago, IL, USA, June 2005.

2005 Stanimire Tomov, Julien Langou, Andrew Canning, Lin-Wang Wang, and Jack Dongarra. Comparison of nonlinear conjugate-gradient methods for computing the electronic properties of nanostructure architectures. In Vaidy S. Sunderman, Geert Dick van Albada, Peter M.A. Sloot, and Jack J. Dongarra, editors, *the Proceedings of the 5th International Conference on Computational Science (ICCS). Springer's Lecture Notes in Computer Science 3514, Part III*, pages 317–235, Atlanta, GA, USA, May 2005. Springer Verlag.

2003 Guillaume Alléon, Bruno Carpentieri, Iain S. Duff, Luc Giraud, Julien Langou, Émeric Martin, and Guillaume Sylvand. Efficient parallel iterative solvers for the solution of large dense linear systems arising from the boundary element method in electromagnetism. In *the Proceedings of the International Conference on Supercomputing in Nuclear Application (SNA)*, Paris, September 2003.

3.3 Book Chapters

2013 Matthias Bolten, Laura Grigori, Julien Langou, and Marian Vajteršic. *Euro-Par 2013, LNCS 8097*, Topic 10: Parallel Numerical Algorithms (Introduction). F. Wolf, B. Mohr, and D. an Ney (Eds.). pp. 482–483, Springer-Verlag Berlin Heidelberg, 2013.

2013 Jack Dongarra, Victor Eijkhout, and Julien Langou. *Handbook of Linear Algebra, Second Edition*, chapter 77: Summary of Software for Linear Algebra Freely Available on the Web. CRC press, 2013.

2013 Zhaojun Bai, James Demmel, Jack Dongarra, Julien Langou, and Jenny Wang. *Handbook of Linear Algebra, Second Edition*, chapter 75: LAPACK. CRC press, 2013.

2013 Jack Dongarra, Victor Eijkhout, and Julien Langou. *Handbook of Linear Algebra, Second Edition*, chapter 74: BLAS. CRC press, 2013.

2013 Jakub Kurzak, Piotr Luszczek, Asim YarKhan, Mathieu Faverge, Julien Langou, Henricus Bouwmeester, and Jack Dongarra. *Handbook of Multi and Many-Core Processing: Architecture, Algorithms, Programming, and Applications*, chapter: Multithreading in the PLASMA Library. CRC Computer & Information Science Series. Chapman & Hall, August 2013.

2009 Alfredo Buttari, Jack Dongarra, Jakub Kurzak, and Julien Langou. *Cyberinfrastructure*, chapter 1: Parallel Dense Linear Algebra Software in the Multicore Era. Nova Science Publishers, 2009.

2007 Jack J. Dongarra, Zizhong Chen, George Bosilca, and Julien Langou. *Petascale Computing: Algorithms and Applications*, chapter chapter 13: Disaster Survival Guide in Petascale Computing: An Algorithmic Approach, pages 263–288. Chapman & Hall, December 2007.

2007 Alfredo Buttari, Jack Dongarra, Jakub Kurzak, Julie Langou, Julien Langou, Piotr Luszczek, and Stanimire Tomov. *High Performance Computing and Grids in Action*, chapter Exploiting Mixed Precision Floating Point Hardware in Scientific Computations. IOS Press, Amsterdam, November 2007.

2007 James Demmel, Jack Dongarra, Beresford Parlett, William Kahan, Ming Gu, David Bindel, Yozo Hida, Xiaoye Li, Osni Marques, E. Jason Riedy, Christof Voemel, Julien Langou, Piotr Luszczek, Jakub Kurzak, Alfredo Buttari, Julie Langou, and Stanmire Tomov. *Handbook of Parallel Computing: Models, Algorithms and Applications*, chapter 29: Prospectus for the Next LAPACK and ScaLAPACK Libraries, pages 29:1–21. CRC press, December 2007.

2006 Jack Dongarra, Victor Eijkhout, and Julien Langou. *Handbook of Linear Algebra*, chapter 77: Summary of Software for Linear Algebra Freely Available on the Web, pages 77:1–3. CRC press, 2006.

2006 Zhaojun Bai, James Demmel, Jack Dongarra, Julien Langou, and Jenny Wang. *Handbook of Linear Algebra*, chapter 75: LAPACK, pages 75:1–24. CRC press, 2006.

2006 Jack Dongarra, Victor Eijkhout, and Julien Langou. *Handbook of Linear Algebra*, chapter 74: BLAS, pages 74:1–7. CRC press, 2006.

2006 Victor Eijkhout, Julien Langou, and Jack Dongarra. *Frontiers of Parallel Processing for Scientific Computing*, chapter 13: Parallel Linear Algebra Software, pages 233–247. SIAM Software, Environments and Tools. Society for Industrial and Applied Mathematics, Philadelphia, PA, USA, 2006.

3.4 Manuscript

2003 Julien Langou. *Iterative methods for solving linear systems with multiple right-hand sides.* Ph.D. dissertation, INSA Toulouse, June 2003.

3.5 Technical reports, working notes, etc.

2010 Henricus Bouwmeester and Julien Langou. A critical path approach to analyzing parallelism of algorithmic variants. Application to Cholesky inversion. Technical report arxiv:1010.2000, 2010.

2010 Julien Langou. Computing the R of the QR factorization of tall and skinny matrices using MPI_Reduce. Technical report arxiv:1002.4250, 2010.

2009 Julien Langou. Translation and modern interpretation of Laplace's théorie analytique des probabilités, pages 505-512, 516-520. Technical report arXiv:0907.4695, July 2009.

4 Courses Taught

Undergraduate

MA 3191 Applied Linear Algebra (Spring 2013),
MA 3195 Linear Algebra & Differential Equations (Spring 2008, Fall 2008, Fall 2009, Spring 2011, Fall 2011 (2x), Spring 2012),
MA 4310 Introduction to Real Analysis I (Fall 2009, Fall 2010, Spring 2011 Fall 2012),
MA 4650 Numerical Analysis I (Fall 2006, Fall 2007, Fall 2013),
MA 4733 Partial Differential Equations (Fall 2012).

Graduate

MA 5070 Applied Analysis (Spring 2010),
MA 5660 Numerical Analysis I (Fall 2006, Fall 2008, Fall 2013),
MA 5718 Applied Linear Algebra (Spring 2011, Spring 2012, Spring 2014),
MA 5733 Partial Differential Equations (Fall 2012),
MA 7665 Numerical Linear Algebra (Spring 2007, Spring 2009, Fall 2010),
MA 7664 Iterative Methods in Numerical Linear Algebra (Fall 2007),
MA 7924 Readings in Advanced Numerical Linear Algebra (pretty much every semester).

5 Presentations at Meetings and Seminars Presented

Nov 17-22, 2013 Denver, CO. SC2013: High performance computing, networking and storage conference. Attendee.

Jul 24-26, 2013 Toulouse, France. Recent Advances on Optimization workshop. Attendee.

Jul 17, 2013 Manchester, UK. Invited for giving a seminar at University of Manchester, School of Mathematics. Talk.

Jul 15-19, 2013 Daresbury Laboratory, Warrington, UK. Hartree Summer School: "Programming for Petascale". Three lectures on Numerical Linear Algebra during the week.

Jul 3-4, 2013 Bordeaux, France. Fast LA workshop. Attendee.

Mar 28, 2013 University of Tennessee. Invited for giving a seminar at the University of Tennessee.

Jun 28-30, 2012 Pittsburgh, PA. 7th Scheduling for Large Scale Systems Workshop. Talk.

Jun 24-25, 2012 Denver, CO. Review Panel for SC'13. Reviewer.

Jun 25-26, 2012 Toulouse, France. Sparse Days Meeting 2012. Attendee.

Jun 18-22, 2012 Valencia, Spain. 2012 SIAM Conference on Applied Linear Algebra. Talk.

May 21-24, 2012 Shanghai, China. IPDPS'12: 26th IEEE International Parallel & Distributed Processing Symposium. Talk.

Apr. 28-30, 2012 KAUST, Saudi Arabia. Scalable Hierarchical Algorithms for eXtreme Computing. Invited Plenary Talk.

Nov. 12-18, 2011 Seattle, WA. SC2011: High performance computing, networking and storage conference. Talk.

Aug. 26, 2011 Museum of Contemporary Art, Denver, CO. Mixed Taste 2011: Tag Team Lectures on Unrelated Topics. Lecture.

Jul. 1-31, 2011 LIPN, Université Paris XIII, Villetaneuse, France. Collaboration.

Jun. 12-17, 2011 Lake Tahoe, CA. Householder Symposium XVIII. Talk.

Jun. 6-10, 2011 INRIA, Sophia-Antipolis, France: CEA-EDF-INRIA summer school. Lecture.

May 29-Jun 1, 2011 Aussois, France. 4th "Scheduling in Aussois" Workshop. Conference. Talk.

May 22-28, 2011 ENS Lyon, Lyon, France: Collaboration.

Feb. 2-6, 2011 Knoxville, TN, collaboration and seminar at ICL.

Jun. 30-Jul. 2, 2010 Basel, Switzerland: 6th International Workshop on Parallel Matrix Algorithms and Applications (PMAA'10) Talk.

Jun. 22-25, 2010 Berkeley, California: International meeting on High Performance Computing for Computational Science (VECPAR'10). Talk.

June 6-9, 2010 Reykjavík, Island: Para 2010: State of the Art in Scientific and Parallel Computing. Talk.

Jun. 2-4, 2010 Aussois, France: 3rd "Scheduling in Aussois" Workshop. Talk.

Mar. 25-26, 2010 Knoxville, Tennessee: ICL 20 year workshop.

Feb. 24-26, 2010 Seattle, Washington: SIAM Conference on Parallel Processing and Scientific Computing (PP10). *Implementing Communication-Optimal Parallel and Sequential QR Factorizations.* Talk.

Jan. 22, 2010 Colorado School of Mines, Golden, Colorado: Mathematical & Computer Sciences Departmental Colloquia. *Towards an Efficient Tile Matrix Inversion of Symmetric Positive Definite Matrices on Multicore Architectures.*

Dec. 8-10, 2009 San Diego, California: Scientific Grand Challenges Workshop Series: Architectures and Technology workshop. Invited.

Oct. 28, 2009 Monterey, California: SIAM Conference on Applied Linear Algebra (LA09). *Extending Algorithm Based Fault Tolerance in Order to Support Error on the Fly.* Talk.

Aug. 26, 2009 University of Colorado Denver, Denver, Colorado: Statistics Seminar. *Translation and modern Interpretation of thirteen pages of Laplace's 1820 treatise.* Talk.

Jul. 30, 2009 CERFACS, Toulouse, France: Parallel Algorithms Internal Meetings. *Translation and modern Interpretation of thirteen pages of Laplace's 1820 treatise.* Talk.

Jun. 23-26, 2009 University of Strathclyde, Glasgow, Scotland, UK: 23rd Biennial Conference on Numerical Analysis. Attendee.

Jun. 22, 2009 Kuala Lumpur, Malaysia: Asian Mathematical Conference (AMC) 2009. *Current trends in Numerical Linear Algebra and Challenges for the Future.* One-day workshop.

Jun. 1-2, 2009 Portland, Oregon, USA: technical papers committee meeting of SC09.

May 15, 2009 Knoxville, Tennessee: Scheduling for large-scale systems. *Fault Tolerant Linear Algebra: goals and methods.* Invited Talk.

Apr. 01, 2009 Tsukuba, Japan: Seminar at the Center for Computational Sciences, University of Tsukuba. *Mixed single-double precision solver.* Invited Talk.

Mar. 27, 2009 Tokyo, Japan: Advanced Supercomputing Environment (ASE) Seminar. *Communication Optimal and Tile Algorithms for Dense Linear Algebra: Auto-Tuning Opportunities in this new Design Space.* Invited Talk.

Mar. 25, 2009 Kyoto, Japan: *Communication Optimal and Tile Algorithms for Dense Linear Algebra.* Invited Talk.

Mar. 23, 2009 Nagoya, Japan: *Numerics of the Gram Schmidt Algorithm.* Invited Talk.

Mar. 14, 2009 Auraria Campus, Denver, CO: SIAM Front Range Student Conference. Attendee.

Feb. 20, 2009 Washington D.C.: NSF Workshop: Future Directions in Tensor-Based Computation and Modeling. *Communication Avoiding and Tiled Algorithm for "2D" Linear Algebra*, Invited Talk.

Nov. 17, 2008 Boulder, Colorado: 2008 EI Research Symposium and Seed Grant Competition. *Eigenvalue solvers for computer simulations of efficient solar cell materials*. Poster.

Jun. 27, 2008 Knoxville, Tennessee: Friday lunch talk at Innovative Computing Laboratory, University of Tennessee. *The Problem with the Linpack Benchmark Matrix Generator*. Talk.

Jun. 01-06, 2008 Zeuthen, Germany: Householder Symposium XVII. *Reduce Factorizations*. Talk.

May 31, 2008 Berlin, Germany: Memorial Workshop for Ralph Byers at TU Berlin *The contribution of Ralph Byers to the LAPACK open source code viewed by an lapacker*. Talk.

May 29, 2008 French Institute of Petrol (IFP), Rueil-Malmaison, France: Seminar at the IFP. *The problem with restarted GMRES*. Talk.

Mar. 13, 2008 Georgia, Atlanta: SIAM conference on Parallel Processing for Scientific Computing. *AllReduce Algorithms: Application to Householder QR Factorization*. Talk.

Mar. 12-14, 2008 Georgia, Atlanta: SIAM conference on Parallel Processing for Scientific Computing. *Fault-tolerant Algorithms for Dense Linear Algebra*. Talk.

Mar. 07, 2008 Knoxville, Tennessee: Friday lunch talk at Innovative Computing Laboratory, University of Tennessee. *The convergence of Restarted GMRES for Normal Matrices is Sublinear*. Talk.

Mar. 01, 2008 University of Colorado at Denver, Denver, CO: 2008 SIAM Front Range Applied Mathematics Student Conference. Attendee.

Oct. 08-12, 2007 Météopole, Toulouse, France: Sparse Days Meeting 2007 at CERFACS & CERFACS 20th Anniversary Meeting. *Allreduce algorithms: Application to Householder factorization*. Invited Presentation.

Sep. 30, 2007 Paris, France: Euro PVM/MPI 07. *Julien Langou and George Bosilca: Advanced MPI programming*. Invited, half-day tutorial on MPI.

Jul. 30-Aug. 02, 2007 Snowbird, Utah: CScADS Workshops 2007: Libraries and Algorithms for Petascale Applications. *Latency-Avoiding and Fault-Tolerant Algorithms for Dense Linear Algebra and Petascale Architectures*. Invited Presentation.

Jul. 09-12, 2007 Météopole, Toulouse, France: 2007 International Conference On Preconditioning Techniques For Large Sparse Matrix Problems In Scientific And Industrial Applications. *Allreduce algorithms: Application to Householder factorization*. Poster.

Jul. 02-06, 2007 Barcelona, Spain: Advanced Course on Numerical Linear Algebra. *Survey and description of the most useful packages/libraries available for Numerical Linear Algebra*. Invited lecturer for Summer School.

Jun. 26-29, 2007 Dresden, Germany: International Supercomputing Conference ISC'07. *Scalability and Fault Tolerance of Dense Linear Algebra Kernels for Petascale Systems*. Invited presentation.

Mar. 23-31, 2007 Stanford University, Palo Alto, CA: Stanford 50: State of the Art and Future Directions of Computational Mathematics and Numerical Computing. *Allreduce algorithms: application to Househodler transformations*. Poster.

Mar. 22, 2007 CU Boulder, Boulder, CO: CU-NIST Research Symposium. *Efficient eigenvalue solvers for nanosciences*. Poster.

Mar. 19, 2007 Copper Mountain, CO: Thirteenth Copper mountain conference on multigrid methods Tutorial series on basic methods, more advanced techniques, and cache-based algorithms by Van Henson and Craig Douglas. Attendee.

Mar. 03, 2007 University of Colorado at Denver, Denver, CO: 2007 SIAM Front Range Applied Mathematics Student Conference. Attendee.

Feb. 15, 2007 Colorado State University, Fort Collins, CO: Applied Math Seminar. *Rounding error analysis of the classical Gram-Schmidt orthogonalization process*. Talk.

Oct. 03, 2006 CU Boulder, Boulder, CO: CU-NREL Research Symposium. *Eigenvalue solvers for computer simulations of efficient solar cell materials*. Poster.

Sep. 11, 2006 University of Colorado at Denver, Denver, CO: Computational Mathematics Colloquium. *Importance and preliminaries research in fault-tolerant numerical linear algebra*. Talk.

Jul. 24-27, 2006 Düsseldorf, Germany: GAMM SIAM Conference on Applied Linear Algebra 2006. *GCR vs Flexible GMRES*. Talk.

Jul 11-12, 2006 ARSC, Fairbanks, Alaska: Numerical Libraries Workshop (PETSc, ATLAS, SuperLU, FFTW, LAPACK, ScaLAPACK, ARPACK). Instructor.

Jun. 18-21, 2006 Umeå, Sweden: PARA 06.

Apr. 02-04, 2006 Copper Moutain (CO): Ninth Copper Mountain Conference On Iterative Methods.

Mar. 01-03, 2006 Golden (CO): meeting with NREL, LBL and UTK for the nanotechnology project (DOE).

Feb 25-28, 2006 Berkeley (CA): meeting with LBL and UTK for the nanotechnology project (DOE).

Feb 22-24, 2006 San Francisco (CA): SIAM PP06.

Nov. 14-18, 2005 Seattle (WA): SC05.

Oct. 11-13, 2005 Santa Fe (NM): LACSI Symposium 2005.

Sep. 18-21, 2005 Sorrento (Naples), Italy: EURO PVM MPI 2005 – 12th European Parallel Virtual Machine and Message Passing Interface Conference.

Aug. 28-Sep. 03, 2005 Berkeley (CA): Visit at UCB and LBL.

Jun. 19-27, 2005 Christchurch, New Zealand: Invited for a week by the Mathematics Department of the University of Christchurch.

May 22-27, 2005 Champion (PA): Householder Symposium XVI.

May 19-21, 2005 Atlanta (GA): 2005 International Conference On Preconditioning Techniques For Large Sparse Matrix Problems In Scientific And Industrial Applications.

May 05-08, 2005 Toronta (ON): 7th IMACS International Symposium on Iterative Methods in Scientific Computing.

Mar. 14-18, 2005 Berkeley (CA): Visit to Lin-Wang Wang, Andrew Canning, and Osni Marques in NERSC.

Nov. 13-19, 2004 Golden (CO): Visit of the Solid State Theory Group at NREL.

Nov. 15, 2004 Denver (CO): Seminar at the University of Colorado at Denver.

Nov. 06-12, 2004 Pittsburgh (PA): SC2004: High performance computing, networking and storage conference.

Nov. 01-05, 2004 Albuquerque (NM): Visit at Sandia National Laboratory.

Jul. 08-09, 2004 Brest, France: Visit of the Université de Brest (invited by Pr. Miloud Sadkane and Dr. Mickaël Robbé).

Jun. 28-Jul. 01, 2004 Hagen, Germany: IWASEP 5: V International Workshop on Accurate Solution of Eigenvalue Problems.

Apr. 29, 2004 Raleigh (NC): Seminar at North Carolina State University (invited by Pr. William Stewart).

Mar. 28-Apr. 02, 2004 Copper Mountain (CO): Copper Montain Conference on Iterative Methods.

Feb. 25-27, 2004 San Francisco (CA): PP04: SIAM Parallel Processing for Scientific Computing.

Nov. 11, 2003 University Park (PA): Colloquium at Penn State University (invited by Pr. Jesse Barlow).

Jul. 24, 2003 Oak-Ridge (TN): Seminar at ORNL (invited by Ed d'Azevedo).

Jul. 21, 2003 Knoxville (TN): Seminar at ICL-UTK in Knoxville (TN) (invited by Jack Dongarra).

Jul. 15-19, 2003 Williamsburgh (VA): Eighth SIAM Conference on Applied Linear Algebra.

Jun. 10, 2003 Saint-Girons, France: PhD. thesis defense.

Jun. 03, 2003 Fribourg, Switzerland: Presentation at Univerity of Fribourg (invited by Jean-Paul Berrut).

May 15-16, 2003 Calais, France: Quatrième séminaire sur l'algorithmique numé rique appliquée aux problèmes industriels.

Nov. 9-10, 2002 Neuchâtel, Switzerland: 2nd International workshop on Parallel Matrix Algorithms and Applications (PMAA'02).

Aug. 04-10, 2002 Milovy, Czech Republic: Computational Linear Algebra with Applications.

Mar. 28, 2002 Copper Moutain (CO): Seventh Copper Mountain Conference on Iterative Methods.

Feb. 05, 2002 Institute of Computer Science, Prague, Czech Republic: Visit.

May 28-31, 2001 Heraklion, Crete: 5th IMACS Conference on Iterative Methods in Scientific Computing.

Jun. 14, 2000 Université Paul Sabatier, Toulouse, France: SEA 2000.

May 07, 2000 Toulouse, France: Workshop on preconditioning techniques.

Apr. 03-07, 2000 Copper Mountain, (CO), USA: Sixth Copper Mountain Conference on Iterative Methods.

6 Professional Organizations

Society of Industrial and Applied Mathematics (since 2001).

7 Other Indicators of Scholarship

Award
College of Liberal Arts and Sciences Faculty Service Award 2012
College of Liberal Arts and Sciences Faculty Research and Creative Activities Award 2011.

Current
Ph.D. adviser of Bradley Lowery and Stephanie Patterson.

Previous
Post-Doctoral adviser of Peizhen Zhu. (2013.)
Post-Doctoral adviser of Henricus Bouwmeester. (Spring 2013, now at UC Denver.)
Post-Doctoral adviser of Rodney James. (From 2011 to 2013, now at Colorado College.)
Ph.D. adviser of Matthew Nabity. (Defended Summer 2013. Will Graduate Fall 2013.)
Ph.D. adviser of Henricus Bouwmeester. (Graduated Fall 2012.)

7.1 Funding

2013 Title: SI2-SSI: Collaborative Research: Sustained Innovation for Linear Algebra Software (SILAS)
Period: from 10/01/2013 to 09/30/2016.
Amount: $300,000.00.
Awarded amount to date: $210,000, continuing: +$40,000 (FY 2014), +$50,000 (FY 2015).
Funding Agency: NSF.
Award Number: ACI 1339797.

2012 Title: Parallel Preconditioned Eigenvalue and Singular Value Solvers
Period: from 2011 to 2014.
Amount: $178,524.00.
Funding Agency: NSF.
Award Number: DMS 1115734.
Note: The award was initially given to Prof. Knyazev. Prof. Knyazev was PI for the first year of the project. I took over in August 2012 as PI of the project for the last two years of the award.

2011 Title: CAREER: Foundations for understanding and reaching the limits of standard numerical linear algebra.
Period: from 2011 to 2016.
Amount: $400,000.00.
Funding Agency: NSF.
Award Number: CCF 1054864.

2010 Title: Collaborative Research: SDCI HPC Improvement: Improvement and Support of Community Based Dense Linear Algebra Software for Extreme Scale Computational Science.
Period: from 2010 to 2014.
Amount: $400,000.00.
Funding Agency: NSF.
Award Number: OCI 1032861.

2010 Title: II-NEW: GPU Cluster for Computing Research.
Period: from 03/15/2010 to 02/28/2014.

Amount: $435,000.
Funding Agency: NSF.
Award Number: CNS 0958354.

2009 Title: Towards efficient Helmholtz equation simulation in the frequency domain on Hybrid GPU clusters.
Period: from 07/15/2009 to 08/14/2009.
Amount: 16,395 euros.
Funding Agency: Total.

2009 Title: CPA-ACR-T: PLASMA: Parallel Linear Algebra Software for Multiprocessor Architectures. (Supplement for.)
Period: from 09/01/2009 to 08/31/2011.
Amount: $42,961.
Funding Agency: NSF.

2009 Participated in the redaction of the proposal entitled: MRI–Consortium: Acquisition of a Supercomputer by the Front Range Computing Consortium. that was awarded by NSF for about $4,000,000. PI was Henry Tufo from University of Colorado at Boulder.

2008 Title: CPA-ACR-T: PLASMA: Parallel Linear Algebra Software for Multiprocessor Architectures.
Period: from 09/01/2008 to 08/31/2011.
Amount: $214,799.
Funding Agency: NSF.

2008 Title: Dense Linear Algebra and Multicore.
Project Period: from 06/01/2008 to 07/31/2008.
Amount: $21,656.
Funding Agency: University of Tennessee.

2007 Title: Fault Tolerant Algorithms.
Period: from 06/01/2007 to 08/31/2007.
Amount: $30,583.
Funding Agency: University of Tennessee.

7.2 Software for Scientific Computing

LAPACK/ScaLAPACK maintain and support the LAPACK source code, in charge of all the software releases since 2006.

7.3 Visiting positions

Summer 2012 Visiting Position at the University of Paris XIII for one month

Summer 2011 Visiting Position at the University of Paris XIII for one month

Summer 2010 Visiting Position at INRIA for one month

Summer 2009 Visiting Position at CERFACS for one month

Summer 2008 Visiting Position at UTK for three months

Summer 2007 Visiting Position at UTK for three months

8 Service

8.1 Departmental Services

8.1.1 PhD Thesis Committees

Ilya Lashuk (2007, adviser Knyazev),
Eugene Vecharynski (2010, adviser Knyazev),
Bedřich Sousedík (2010, adviser Mandel),
Keith Wojciechowski (2011, adviser Bennethum),
Kannanat Chamsri (2012, adviser Bennethum),
Donald Mc Cuan (2012, adviser Knyazev),
Peizhen Zhu (2012, adviser Knyazev),
Eric Sullivan (2013, adviser Bennethum),
Marc Mueller (DNF, adviser Bennethum),
Volodymyr Kondratenko (currently in the program, adviser Mandel).

8.1.2 Master Project Committees

Clifford Bainter (2010, adviser Langou),
Jeremy Noe (2008, adviser Bennethum),
Narimene Lekmine (2007, adviser Billups).

8.1.3 Department executive committee

Member since Fall 2009.

8.1.4 Undergraduate Committee

Member in Fall 2006, Spring 2007, Fall 2007, Spring 2008.
Chair since Fall 2009.

8.1.5 Graduate Committee

Member in Fall 2008, Spring 2009.

8.1.6 Merit Evaluation Committee

Member in 2008. Chair in 2009. Chair in 2013. Chair in 2014.

8.1.7 RTP Committee

2013-2014: Chair for Research (one case), member for Teaching (two cases).

8.1.8 Search Committee

2012-2013: Chair for search committee for #F00014 Tenure-Track Assistant Professor position, Numerical Methods and Scientific Computing.

8.1.9 Analysis Preliminary Committee

Member of the analysis preliminary exam committee for January 2008, May 2008, January 2009, June 2009 and January 2010.

8.1.10 Linear Algebra Preliminary Committee

Member of the linear algebra preliminary exam committee for May 2007 and May 2012. Chair of the linear algebra preliminary exam committee for June 2010, January 2011, June 2011, January 2012, January 2013, June 2013, and January 2014.

8.2 CCM services

8.2.1 CCM seminar organizer

Fall 2007 (4 seminars), Spring 2007 (7 seminars), Fall 2008 (7 seminars), Spring 2009 (8 seminars), and Fall 2012 (9 seminars), Fall 2013 (6 seminars), Spring 2014 (2 seminars and counting).

8.2.2 CCM executive committee

Member from Fall 2007 to Spring 2012.

8.2.3 CCM director

Since Fall 2012.

8.3 College / Campus level

8.3.1 CCM executive committee

Member from Fall 2007 to Spring 2012.

8.4 Agency Services

Served on one ISF panels (Israel Science Foundation): 2014. Served on two DOE panels (U.S. Department of Energy): 2005 and 2012. Served on two NSF panels (National Science Foundation): 2008 and 2012.

8.5 Professionnal Services

8.5.1 GK-12 mentor for 2008-2009

8.5.2 Reviews for referred articles in the following journals

2013 – 10 manuscripts: ACM Transactions on Mathematical Software (2), Applied Numerical Mathematics (1), Journal of Engineering Mathematics (1), Journal of Parallel and Distributed Computing (2), Parallel Computing (2), Parallel Processing Letters (1), Numerical Linear Algebra with Applications (1).

2012 – 13 manuscripts: Computers and Mathematics with Applications (1), Parallel Computing (2) Journal of Computational Science (1), Concurrency and Computation: Practice and Experience (1), BIT Numerical Mathematics (1), ACM Transactions on Mathematical Software (2), Fuzzy Sets and Systems (1), Computing in Science and Engineering (1), Parallel Processing Letters (1), SIMAX (1), Numerical Linear Algebra with Applications (1).

2011 – 9 manuscripts: Parallel Computing (1), BIT Numerical Algorithms (1), Numerical Linear Algebra with Applications (2) International Journal of High Performance Computing (1), Journal of Computational Science (1), ACM Transactions on Mathematical Software (2), Measurement (1).

2010 – 9 manuscripts: Parallel Computing (3), SIAM Journal on Matrix Analysis and Applications (1), NOLTA, Nonlinear Theory and Its Applications (1), Applied Numerical Mathematics (1), SIAM Journal on Scientific Computing (1), Journal of Computational Science (1), Neural Processing Letters (1).

2009 – 12 manuscripts: Parallel Computing, SIAM Journal on Numerical Analysis, Parallel Computing, Software: Practice and Experience, Parallel Computing, International Journal of High Performance Computing Applications, ACM Transactions on Mathematical Software, ACM Transactions on Mathematical Software, SIAM Journal on Matrix Analysis and Applications, SIAM Journal on Matrix Analysis and Applications, Concurrency and Computation: Practice and Experience, ACM Transactions on Mathematical Software.

2008 – 5 manuscripts: SIAM Journal on Scientific Computing, SIAM Journal on Matrix Analysis and Applications, SIAM Journal on Scientific Computing, Journal of Statistical Computation and Simulation, Electronic Transactions on Numerical Analysis.

2007 – 3 manuscripts: Concurrency and Computation: Practice and Experience, Parallel Computing, Journal of Computational and Applied Mathematics.

<2007: BIT Numerical Mathematics, Applied Numerical Mathematics, International Journal of High Performance Computing Applications, Parallel Processing Letters, Journal of Parallel and Distributed Computing, IMACS Journal Applied Numerical Mathematics, Numerische Mathematik, SIAM Journal on Matrix Analysis and Applications, ACM Transactions on Mathematical Software, ACM Transactions on Mathematical Software, SIAM Journal on Scientific Computing, Applicable Algebra in Engineering, Communication, and Computing.

8.5.3 Reviews for referred conference proceedings

2013 – 38 manuscripts: Euro-Par 2013 (10), HiPC'13 (5), ICPP'13 (6), IPDPS'13 (7), PPAM'13 (3), SC'13 (7).

2012 – 22 manuscripts: VecPAR 2012 (3), HiPC '12 (6), IEEE CSE 2012 (3), IEEE IPDPS'13 (10).

2011 – 14 manuscripts: IPDPS'12 (8), PPAM'11 (3), EuroPar'11 (3).

2010 – 13 manuscripts: IPDPS'10 (8), PARA'10 (3), ICPP 2010 (1), HPSC 2009 (1).

2009 – 15 manuscripts: SC 2009 (10), HPSC 2009 (1), HPCC 2009 (3), IPDPS 2009 (1).

<2009 VecPar 2002 (1), HPC Asia 2004 (1), ICCS 2005 (2), Workshop on state-of-the art in Scientific and Parallel Computing 2006 (5), ACM International Conference on Computing Frontiers 2007 (1).

8.5.4 Reviewer for Mathematical Reviews

8.5.5 Minisymposium organizer

- Organized a minisymposium for the workshop on state-of-the art in Scientific and Parallel Computing 2006 (PARA2006). Minisympoisum on Recent Advances in Dense Linear Algebra. Seven speakers.
- Organized a minisymposium at SIAM Conference on Parallel Processing 2006. Minisympoisum on Linear Algebra Routines for Parallel High Performance Applications. Four speakers.

8.5.6 Programm Committee for conferences

HPCC09, SC'09, IPDPS'10, iWASEP'11, HPC 2012, IPDPS'12, IEEE CSE 2012, HPC 2013 (Steering Commitee), VecPAR 2013, EuroPar 2013 (Topic Chair for Topic 10: Parallel Numerical Algorithms), IPDPS 2013, IPCC 2013, SC'13, HiPC'13, SC'14, IPDPS 2014.