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Personal

Citizenship: United States of America and The Netherlands

Education

B.S. in Mathematics and Computer Science, University of Wisconsin-Madison, Aug. 1981.

Ph.D. in Applied Mathematics, University of Maryland, College Park, Aug. 1987.

Professional Experience

Spring 2015 - present: Director, Science of High-Performance Computing Group, Oden Institute, UT-Austin.

September 2002 - present: Professor, Department of Computer Science, UT-Austin.

September 1992 - present: Core member, Oden Institute (formerly Institute for Computational Engineering and Sciences), UT-Austin.

September 1994 - August 2002: Associate Professor, Department of Computer Sciences, UT-Austin.

September 1987 - August 1994: Assistant Professor, Department of Computer Sciences, UT-Austin.

Aug. 1990 - May 1991: Research Professor, Computer Science Department, Univ. of Tennessee, Knoxville.

Awards and Honors

SIAM Special Interest Group on Supercomputing Best Paper Prize (2020)

Peter O'Donnell Distinguished Researcher Award (2016)

President's Associates Teaching Excellence Award (2008)

Faculty Fellowship #5 in Computer Sciences, (1995–2002)

Dean's Curriculum Development Award, Spring 1998.

IBM Predoctoral Fellowship, 1986-1987

Thesis

Implementing the QR-algorithm on an array of processors. Supervised by Prof. G. W. (Pete) Stewart.

Current Research Interests

Parallel Computing; Scientific Computing; Linear Algebra; High-Performance Computing; Software Architectures of Scientific Libraries; Mechanical Derivation of Libraries; Formal Derivation of Algorithms; Special Purpose Hardware for Matrix Operations; Technology in education

Pedagogical Artifacts

Margaret Myers and **Robert van de Geijn**. *Linear Algebra: Foundations to Frontiers*. Massive Open Online Course (MOOC) offered on the edX platform since Spring 2014.

Margaret Myers and **Robert van de Geijn**. *LAFF-On Programming for Correctness*. Massive Open Online Course (MOOC) offered on the edX platform since Spring 2017.

Margaret Myers, Devangi Parikh, and **Robert van de Geijn**. *LAFF-On Programming for High Performance*. Massive Open Online Course (MOOC) offered on the edX platform since Spring 2019.

Margaret Myers and **Robert van de Geijn**. *Advanced Linear Algebra: Foundations to Frontiers*. Massive Open Online Course (MOOC) offered on the edX platform since Spring 2020. Also offered as *Advanced Linear Algebra for Computing* as part of the UT Masters in Computer Science Online program.

Publications

Many of the listed recent publications can be found on-line at
`http://shpc.utexas.edu/` and `http://www.cs.utexas.edu/users/plapack/`

Books

Margaret Myers and **Robert van de Geijn**. *Advanced Linear Algebra: Foundations to Frontiers - Notes to LAFF With.* Self-published at `www.ulaff.net`, 2020.

Notes, videos, interactive activities, and programming activities created for a Massive Open Online Course (MOOC) offered by edX

Margaret Myers, Devangi Parikh, and **Robert van de Geijn**. *LAFF-On Programming for High Performance.* Self-published at `www.ulaff.net`, 2019.

Notes, videos, interactive activities, and programming activities created for a Massive Open Online Course (MOOC) offered by edX

Margaret Myers, **Robert van de Geijn**. *LAFF-On Programming for Correctness.* Self-published at `www.ulaff.net`, 2017.

Notes, videos, interactive activities, and programming activities created for a Massive Open Online Course (MOOC) offered by edX

Margaret Myers, Pierce van de Geijn, and **Robert van de Geijn**. *Linear Algebra: Foundations to Frontiers - Notes to LAFF With.* Self-published at `www.ulaff.net`, 2014.

Notes, videos, interactive activities, and programming activities created for a Massive Open Online Course (MOOC) offered by edX

Robert A. van de Geijn and Enrique S. Quintana-Ortí. *The Science of Programming Matrix Computations*. www.lulu.com, 2008.

Robert A. van de Geijn. *Using PLAPACK: Parallel Linear Algebra Package*. The MIT Press, 1997.

Journal Articles

1. Field G. Van Zee, Devangi N. Parikh, and **Robert A. van de Geijn**. Supporting mixed-domain mixed-precision matrix multiplication within the BLIS framework . ACM Transactions on Mathematical Software (TOMS), 47 (2), 1-26, 2021.
2. Jianyu Hyang, Chenhan D. Yu, and **Robert A. van de Geijn**. Strassen's Algorithm Reloaded on GPUs. ACM Transactions on Mathematical Software (TOMS) 46 (1), 1-22, 2020.

3. Sandra Catalán, José R Herrero, Enrique S Quintana-Ortí, Rafael Rodrííguez-Sánchez, **Robert van de Geijn**. A case for malleable thread-level linear algebra libraries: The LU factorization with partial pivoting. IEEE access 7, 17617-17633, 2019.
4. Jianyu Huang, Devin A. Matthews, **Robert A. van de Geijn**. "Strassen's Algorithm for Tensor Contraction." SIAM Journal on Scientific Computing 40 (3), C305-C326, 2018.
5. Per-Gunnar Martinsson, Gregorio Quintana-Ortí, Nathan Heavner, and **Robert van de Geijn**. "Householder QR factorization with randomization for column pivoting (HQRRP)." SIAM Journal on Scientific Computing. 39 (2), C96-C115, 2017.
6. Martin D. Schatz, **Robert A. van de Geijn**, Jack Poulson. "Parallel Matrix Multiplication: A Systematic Journey."' SIAM Journal on Scientific Computing. 38 (6), C748-C781, 2016.
7. Field G. Van Zee, Tyler Smith, Bryan Marker, Tze Meng Low, **Robert A. van de Geijn**, Francisco D. Igual, Mikhail Smelyanskiy, Xianyi Zhang, Michael Kistler, Vernon Austel, John Gunnels, Lee Killough. "The BLIS Framework: Experiments in Portability." ACM Transactions on Mathematical Software. 42 (2), Article No. 12, 2016.
8. Field G. Van Zee, **Robert A. van de Geijn** "BLIS: A Framework for Rapidly Instantiating BLAS Functionality." ACM Transactions on Mathematical Software, 41 (3), Article No. 14, June 2015.
9. Martin D. Schatz, Tze Meng Low, **Robert A. van de Geijn**, and Tamara G. Kolda. "Exploiting Symmetry in Tensors for High Performance." SIAM Journal on Scientific Computing, 36(5), Sep. 2014.
10. Ardavan Pedram, Andreas Gerstlauer, and **Robert van de Geijn** "Algorithm, Architecture, and Floating-Point Unit Codesign of a Matrix Factorization Accelerator." IEEE Transactions on Computers, Special Section on Computer Arithmetic, August 2014.
11. Field G. Van Zee, **Robert van de Geijn**, and Gregorio Quintana-Orti. "Restructuring the QR Algorithm for Performance." ACM Transactions on Mathematical Software, 40 (3), Article 18, April 2014.
12. Jack Poulson, Bryan Marker, **Robert A. van de Geijn**, Jeff R. Hammond, Nichols A. Romero. "Elemental: A New Framework for Distributed Memory Dense Matrix Computations." ACM Transactions on Mathematical Software. 39 (2), Article 13, 24 pages, February 2013.
13. Francisco D. Igual, Gregorio Quintana-Ortí and **Robert van de Geijn**. "Scheduling algorithms-by-blocks on small clusters." Concurrency and Computation: Practice and Experience. 25 (3), 2013.
14. Bryan Marker, Don Batory, and **Robert van de Geijn**. "A Case Study in Mechanically Deriving Dense Linear Algebra Code." The International Journal of High Performance Computing Applications, 27 (4), November 2013.
15. Paolo Bientinesi, John A. Gunnels, Margaret E. Myers, Enrique S. Quintana-Ortí, Tyler Rhodes, **Robert A. van de Geijn**, and Field G. Van Zee. "Deriving dense linear algebra libraries." Formal Aspects of Computing, 25 (6), November 2013.
16. Field G. Van Zee, **Robert A. van de Geijn**, Gregorio Quintana-Ortí, G. Joseph Elizondo. "Families of Algorithms for Reducing a Matrix to Condensed Form." ACM Transactions on Mathematical Software. 39 (1), Article 2, 2012.
17. Ardavan Pedram, **Robert A. van de Geijn**, Andreas Gerstlauer. "Codesign Tradeoffs for High-Performance, Low-Power Linear Algebra Architectures." IEEE Transactions on Computers. 61 (12), December 2012.
18. Bryan Marker, Ernie Chan, Jack Poulson, **Robert van de Geijn**, Rob F. Van der Wijngaart, Timothy G. Mattson, and Theodore E. Kubaska. "Programming Many-Core Architectures - A Case Study: Dense Matrix Computations on the Intel SCC Processor." Concurrency and Computation: Practice and Experience. Volume 24, Issue 12, August 2012.

19. Francisco D. Igual, Ernie Chan, Enrique S. Quintana-Ortí, Gregorio Quintana-Ortí , **Robert A. van de Geijn**, , Field G. Van Zee. "The FLAME approach: From dense linear algebra algorithms to high-performance multi-accelerator implementations." Journal of Parallel and Distributed Computing, 72, (9), September 2012.
20. Gregorio Quintana-Ortí, Francisco D. Igual, Mercedes Marqués, Enrique Quintana-Ortí, and **Robert van de Geijn**. "A Runtime System for Programming Out-of-Core Matrix Algorithms-by-Tiles on Multithreaded Architectures." ACM Transactions on Mathematical Software. 38 (4) Article 12, 25 pages, 2012
21. **Robert A. van de Geijn**, Field G. Van Zee High-performance up-and-downdating via Householder-like transformations ACM Transactions on Mathematical Software, 38 (1), November 2011.
22. Mercedes Marques, Gregorio Quintana-Orti, Enrique S. Quintana-Orti, **Robert van de Geijn**. "Using desktop computers to solve large-scale dense linear algebra problems." The Journal of Supercomputing, Vol. 58, Issue 2, 2011.
23. Paolo Bientinesi and **Robert van de Geijn**. Goal-Oriented and Modular Approach to Stability Analysis. SIAM Journal on Matrix Analysis and Applications. 32 (1), pages 286–308, 2011.
24. Paolo Bientinesi, Victor Eijkhout, Kyungjoo Kim, Jason Kurtz and **Robert van de Geijn**. "Sparse Direct Factorizations through Unassembled Hyper-Matrices." Computer Methods in Applied Mechanics and Engineering. Volume 199, 2010.
25. Y. Zhang, **R. A. van de Geijn**, M. C. Taylor, and T. K. Sarkar. "Parallel MoM using Higher-Order Basis Functions and PLAPACK In-core and Out-of-core Solvers for Challenging EM Simulations." IEEE Antennas and Propagation Magazine, Volume 51, Issue 5, Oct. 2009.
26. Field G. Van Zee, Ernie Chan, **Robert A. van de Geijn**, Enrique S. Quintana-Ortí, and Gregorio Quintana-Ortí. The `libflame` Library for Dense Matrix Computations. *IEEE Computation in Science and Engineering.* 11(6):56-62, 2009.
27. Gregorio Quintana-Ortí, Enrique S. Quintana-Ortí, **Robert A. van de Geijn**, Field G. Van Zee, and Ernie Chan. Programming Matrix Algorithms-by-Blocks for Thread-Level Parallelism. *ACM Transactions on Mathematical Software.* 36(3) Article 14, 14 pages, 2009.
28. Enrique Quintana-Orti and **Robert van de Geijn**. Updating an LU Factorization with Pivoting. *ACM Transactions on Mathematical Software.* 35(2) Article 11, 16 pages, 2009.
29. Kazushige Goto and **Robert A. van de Geijn**. High-Performance Implementation of the Level-3 BLAS. *ACM Transactions on Mathematical Software*, 35(1) Article 4, 14 pages, 2009.
30. Paolo Bientinesi, Brian Gunter, and **Robert van de Geijn**. Families of Algorithms Related to the Inversion of a Symmetric Positive Definite Matrix *ACM Transactions on Mathematical Software*, 35(1) Article 3, 22 pages, 2009.
31. Mary C. Taylor, Yu Zhang, Tapan K. Sarkar, **Robert A. van de Geijn**. "Parallel MoM Using Higher Order Basis Functions and PLAPACK Out-of-Core Solver for a Challenging Vivaldi Array." Antennas and Propagation Society International Symposium, 2008.' AP-S 2008. IEEE 5-11 July 2008.
32. Kazushige Goto and **Robert A. van de Geijn**. Anatomy of a High-Performance Matrix Multiplication. *ACM Transactions on Mathematical Software.* 34(2) Article 12, 25 pages, 2008.
33. Field G. Van Zee, Paolo Bientinesi, Tze Meng Low, and **Robert A. van de Geijn**. Scalable Parallelization of FLAME Code via the Workqueuing Model. *ACM Transactions on Mathematica Software*, 34(2) Article 10, 29 pages, 2008.
34. Ernie Chan, Marcel Heimlich, Avijit Purkayastha, and **Robert van de Geijn**. Collective Communication: Theory, Practice, and Experience. *Concurrency and Computation: Practice and Experience,* 19(13):1749–1783, July 5, 2007.
35. H. Carter Edwards and **Robert A. van de Geijn**. Application Interface to Parallel Dense Matrix Libraries: Just let me solve my problem! *Concurrency and Computation: Practice and Experience.* In revision.

36. Gregorio Quintana-Ortí and **Robert van de Geijn**. Improving the Performance of Reduction to Hessenberg Form. *ACM Transactions on Mathematical Software,* 32(2):180-194, 2006.

37. Thierry Joffrain, Tze Meng Low, Enrique S. Quintana-Ortí, **Robert van de Geijn**, and Field Van Zee. On Accumulating Householder Transformations. *ACM Transactions on Mathematical Software,* 32(2):169-179, 2006.

38. Brian Gunter and **Robert van de Geijn**. Parallel Out-of-Core Computation and Updating of the QR Factorization. *ACM Transactions on Mathematical Software*, 32(1):60-78, March 2005.

39. Paolo Bientinesi, Inderjit S. Dhillon, and **Robert A. van de Geijn**. A Parallel Eigensolver for Dense Symmetric Matrices Based on Multiple Relatively Robust Representations. *SIAM Journal on Scientific Computing*, Vol. 27, No. 1, 2005.

40. Paolo Bientinesi, Enrique S. Quintana-Ortí, and **Robert van de Geijn**. Representing Linear Algebra Algorithms in Code: The FLAME APIs. *ACM Transactions on Mathematical Software*, 31(1):27-59, March 2005.

41. Paolo Bientinesi, John A. Gunnels, Margaret E. Myers, Enrique S. Quintana-Ortí, and **Robert van de Geijn**. The Science of Deriving Dense Linear Algebra Algorithms. *ACM Transactions on Mathematical Software,* 31(1):1-26, March 2005.

42. Enrique S. Quintana-Ortí and **Robert van de Geijn**. Formal Derivation of Algorithms: The Triangular Sylvester Equation. *ACM Transactions on Mathematical Software*, (29) 2, June 2003.

43. John A. Gunnels, Fred G. Gustavson, Greg M. Henry, and **Robert A. van de Geijn**. FLAME: Formal Linear Algebra Methods Environment. *ACM Transactions on Mathematical Software*, 27(4):422-455, December 2001.

44. Enrique S. Quintana-Ortí and **Robert van de Geijn**. Specialized parallel algorithms for solving Lyapunov and Stein equations. *Journal of Parallel and Distributed Computing*, **61,** pp. 1489–1504, 2001.

45. Enrique S. Quintana, Gregorio Quintana, Xiaobai Sun, and **Robert van de Geijn**. A note on parallel matrix inversion. *SIAM Journal on Scientific Computing*, 22(5):1762–1771, 2001.

46. Y. Fu, K. J. Klimkowski, G. J. Rodin, E. Berger, J. C. Browne, J. K. Singer, **R. A. van de Geijn**, and K. S. Vemaganti. A fast solution method for three-dimensional many-particle problems of linear elasticity. *International Journal on Numerical Methods in Engineering*, 42:1215–1229, 1998.

47. **Robert van de Geijn** and Jerrell Watts. SUMMA: Scalable universal matrix multiplication algorithm. *Concurrency: Practice and Experience*, 9(4):255–274, April 1997.

48. D. Giménez, V. Hernández, **R. van de Geijn**, and A. M. Vidal. A block Jacobi method on a mesh of processors. *Concurrency, Practice and Experience*, 9(5):391–411, May 1997.

49. Po Geng, J. Tinsley Oden, and **Robert van de Geijn**. A parallel multifrontal algorithm and its implementation. *Computational Methods in Applied Mechechanics and Engineering*, 149:289–301, 1997.

50. Almadena Chtchelkanova, John Gunnels, Greg Morrow, James Overfelt, and **Robert A. van de Geijn**. Parallel implementation of BLAS: General techniques for level 3 BLAS. *Concurrency: Practice and Experience*, 9(9):837–857, September 1997.

51. M. Barnett, D. Payne, **R. van de Geijn**, and J. Watts. Broadcasting on meshes with wormhole routing. *Journal of Parallel and Distributed Computing*, 35:111–112, 1996.

52. Greg M. Henry and **Robert A. van de Geijn**. Parallelizing the QR algorithm for the unsymmetric algebraic eigenvalue problem: Myths and reality. *SIAM Journal on Scientific Computing*, 17(4):870–883, 1996.

53. Brian Grayson and **Robert van de Geijn**. A high performance parallel Strassen implementation. *Parallel Processing Letters*, 6(1):3–12, 1996.

54. Po Geng, J. Tinsley Oden, and **Robert van de Geijn**. Massively parallel computation for acoustical scattering problems using boundary element methods. *Journal of Sound and Vibration*, 191(1):145–165, 1996.
55. Jerrell Watts and **Robert van de Geijn**. A pipelined broadcast for multidimensional meshes. *Parallel Processing Letters*, 5(2):281–292, 1995.
56. E. Barragy and **R. van de Geijn**. High performance computational kernels for selected segments of a p finite element code. *International Journal on Numerical Methods in Engineering*, 38:1327–1340, 1995.
57. E. Barragy, G.F. Carey, and **R. van de Geijn**. Performance and scalability for block preconditioned finite element (p) solution of viscous flow. *International Journal on Numerical Methods in Engineering*, 38:1535–1554, 1995.
58. M. Barnett, R. Littlefield, D. Payne, and **R. van de Geijn**. Global combine algorithms for 2-d meshes with wormhole routing. *Journal of Parallel and Distributed Computing*, 24:191–201, 1995.
59. **R. A. van de Geijn**. On global combine operations. *Journal of Parallel and Distributed Computing*, 22:324–328, 1994.
60. Jack Dongarra, **Robert van de Geijn**, and David Walker. Scalability issues affecting the design of a dense linear algebra library. *Journal of Parallel and Distributed Computing*, 22(3), Sept. 1994.
61. Tom Cwik, **Robert van de Geijn**, and Jean Patterson. The application of parallel computation to integral equation models of electromagnetic scattering. *Journal of the Optical Society of America A*, 11(4):1538–1545, April 1994.
62. E. Barragy, G.F. Carey, and **R. van de Geijn**. Performance and scalability of finite element analysis for parallel computation. *Journal of Parallel and Distributed Computing*, 21:202–212, 1994.
63. **Robert A. van de Geijn**. Deferred shifting schemes for parallel QR methods. *SIAM Journal on Matrix Analysis and Application*, 14(1):180–194, January 1993.
64. Jack Dongarra and **Robert van de Geijn**. Reduction to condensed form on distributed memory architectures. *Parallel Computing*, 18:973–982, 1992.

Major Software Efforts

1. BLAS-like Library Instantiation Software (BLIS). `https://github.com/flame/blis`.

   A framework for the rapid instantiation of the Basic Linear Algebra Subprograms (BLAS), available under new/modified/3-clause BSD license.
2. libFLAME. `https://github.com/flame/libflame`.

   An implementation of LAPACK available under new/modified/3-clause BSD license.
3. Parallel Linear Algebra Package (PLAPACK).

   A distributed memory dense linear algebra library available under Gnu General Public License (GPL).
4. Interprocessor Collective Communications Library (intercom)

   A collective communication library.
5. Complex Dense Linear Solver, Release 2.0.

Chapters

1. Victor Eijkhout and **Robert van de Geijn**. " The Spike Factorization as Domain Decomposition Method; Equivalent and Variant Approaches." In High-Performance Scientific Computing (Michael W. Berry, Kyle A. Gallivan, Efstratios Gallopoulos, Ananth Grama, Bernard Philippe, Yousef Saad, and Faisal Saied, eds.) pp. 157-169. Springer London. 2012.

2. Jesper Larsson Traeff and **Robert A. van de Geijn**. "All-to-All." Encyclopedia of Parallel Computing , Part 1, Pages 42-47. 2011.
3. **Robert van de Geijn** and Jesper Larsson Traeff. "Collective Communication." Encyclopedia of Parallel Computing , Part 3, Pages 318-327. 2011.
4. Jesper Larsson Traeff and **Robert A. van de Geijn**. "Broadcast." Encyclopedia of Parallel Computing , Part 2, Pages 186-192. 2011.
5. Field G. Van Zee, Ernie Chan and **Robert A. van de Geijn**. "libflame." Encyclopedia of Parallel Computing , Part 12, Pages 1010-1014, 2011.
6. Jesper Larsson Traeff and **Robert A. van de Geijn**. "Allgather." Encyclopedia of Parallel Computing , Part 1, Pages 39-42. 2011
7. **Robert van de Geijn** and Kazushige Goto. "BLAS (Basic Linear Algebra Subprograms)." Encyclopedia of Parallel Computing , Part 2, Pages 157-164. 2011.

Articles in Conference Proceedings

1. Devangi N. Parikh, Jianyu Huang, Margaret E. Myers, **Robert A van de Geijn**. Learning from optimizing matrix-matrix multiplication. Conference 2018 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), 2018.
2. Jianyu Huang, Leslie Rice, Devin A. Matthews, **Robert A. van de Geijn**. "Generating families of practical fast matrix multiplication algorithms." IEEE International Parallel and Distributed Processing Symposium (IPDPS), 2017.
3. **Robert A. van de Geijn**, Jianyu Huang, Margaret E. Myers, Devangi N. Parikh, Tyler M. Smith. "Lowering Barriers into HPC through Open Education." in Workshop on Education for High Performance Computing (EduHPC), co-located with SC17, Denver, CO, November 2017.
4. Jianyu Huang, Tyler M Smith, Greg M Henry, Robert A van de Geijn. "Strassen's algorithm reloaded." Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC'16), 2016.
5. Bryan Marker, Don Batory, **Robert van de Geijn**. "Understanding Performance Stairs: Elucidating Heuristics ." 29th IEEE/ACM International Conference on Automated Software Engineering (ASE 2014), 2014.
6. Tyler M. Smith, **Robert van de Geijn**, Mikhail Smelyanskiy, Jeff R. Hammond, and Field G. Van Zee. "Anatomy of High-Performance Many-Threaded Matrix Multiplication." International Parallel and Distributed Processing Symposium 2014 (IPDPS 2014), 2014.
7. Bryan Marker, Don Batory, and **Robert van de Geijn**. "Code Generation and Optimization of Distributed-Memory Dense Linear Algebra Kernels." International Workshop on Automatic Performance Tuning (iWAPT'13), 2013
8. Ardavan Pedram, Andreas Gerstlauer and **Robert van de Geijn**. "Floating Point Architecture Extensions for Optimized Matrix Factorization." 21st IEEE International Symposium on Computer Arithmetic, to be held in Austin, Texas, USA in April 2013. Accepted.
9. Ardavan Pedram, Andreas Gerstlauer and **Robert van de Geijn**. "On the Efficiency of Register File versus Broadcast Interconnect for Collective Communications in Data-Parallel Hardware Accelerators." SBAC-PAD 2012.
10. Murtaza Ali, Eric Stotzer, Francisco D. Igual, and **Robert van de Geijn**. "Level-3 BLAS on the TI C6678 multi-core DSP." SBAC-PAD 2012. Francisco D. Igual, Murtaza Ali, Arnon Friedmann, Eric Stotzer, Timothy Wentz, and **Robert van de Geijn**. Unleashing the high-performance and low-power of multi-core DSPs for general-purpose HPC. SC12.
11. Bryan Marker, Jack Poulson, Don Batory, and **Robert van de Geijn**. "Designing Linear Algebra Algorithms by Transformation: Mechanizing the Expert Developer." iWAPT2012.

12. Ardavan Pedram, Syed Gilani, Nam Sung Kim, **Robert van de Geijn**, Michael Schulte, Andreas Gerstlauer. "A Linear Algebra Core Design for Efficient Level-3 BLAS." ASAP, 2012. (poster)
13. Ardavan Pedram, Andreas Gerstlauer, and **Robert van de Geijn**. "A High-Performance, Low-Power Linear Algebra Core." 22rd IEEE International Conference on Application-specific Systems, Architectures and Processors (ASAP 2011), 2011
14. Manuel Fogue and Francisco D. Igual, Enrique Quintana-Orti, and **Robert van de Geijn**. "Retargeting PLAPACK to Clusters with Hardware Accelerators." 2010 International Conference on High Performance Computing and Simulation (HPCS 2010), 2010.
15. Ernie Chan, **Robert van de Geijn**, and Andrew Chapman. "Managing the complexity of lookahead for LU factorization with pivoting." SPAA '10 Proceedings of the 22nd ACM symposium on Parallelism in algorithms and architectures, 2010.
16. Ernie Chan, Jim Nagle, **Robert van de Geijn**, and Field G. Van Zee. "Transforming Linear Algebra Libraries: From Abstraction to Parallelism." *HIPS*, 2010.
17. Ernie Chan, Andrew Chapman, and **Robert van de Geijn**. "Managing the complexity of lookahead for LU factorization with pivoting." In *SPAA10: Proceedings of the Twenty-Second Annual ACM Symposium on Parallelism in Algorithms and Architectures*, Santorini, Greece, June 13-15, 2010.
18. Manuel Fogué, Francisco D. Igual, Enrique Quintana-Ortí, and **Robert van de Geijn**. "Retargeting PLAPACK to Clusters with Hardware Accelerators." em Workshop on Exploitation of Hardware Accelerators (WEHA 2010). Accepted.
19. Victor Eijkhout, Paolo Bientinesi, **Robert van de Geijn**. "Toward Mechanical Derivation of Krylov Solver Libraries." *Procedia Computer Science*, 1(1) 1799-1807, 2010. Proceedings of ICCS2010.
20. Mercedes Marqués, Gregorio Quintana-Ortí, Enrique S. Quintana-Ortí, and **Robert van de Geijn**. "Out-of-Core Computation of the QR Factorization on Multi-Core Processors." Euro-Par 2009.
21. Mercedes Marqués, Gregorio Quintana-Ortí, Enrique S. Quintana-Ortí, and **Robert van de Geijn**. "Solving "Large" Dense Matrix Problems on Multi-Core Processors and GPUs" 10th IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing - PDSEC'09. Roma (Italia). 2009.
22. Mercedes Marqués, Gregorio Quintana-Ortí, Enrique S. Quintana-Ortí, and **Robert van de Geijn**. "Using Graphics Processors to Accelerate the Solution of Out-of-Core Linear Systems"8th IEEE International Symposium on Parallel and Distributed Computing, Lisbon (Portugal), 2009.
23. Gregorio Quintana-Orti, Francisco D. Igual, Enrique S. Quintana-Orti, **Robert van de Geijn**. Solving Dense Linear Systems on Platforms with Multiple Hardware Accelerators. Proceedings of 2009 ACM SIGPLAN Symposium on Principles and Practices of Parallel Programming, Raleigh, North Carolina, February 2009.
24. Gregorio Quintana-Orti, Enrique S. Quintana-Orti, Ernie Chan, **Robert van de Geijn**, and Field G. Van Zee. Design of Scalable Dense Linear Algebra Libraries for Multithreaded Architectures: the LU Factorization. Proceedings of the Workshop on Multithreaded Architectures and Applications, Miami, Florida, April 2008.
25. Gregorio Quintana-Orti, Enrique S. Quintana-Orti, Alfredo Remon, and **Robert A. van de Geijn**. An Algorithm-by-Blocks for SuperMatrix Band Cholesky Factorization. Proceedings of the 8th International Meeting on High Performance Computing for Computational Science, Toulouse, France, June 2008.
26. Jeff Diamond, Behnam Robatmili, Stephen W. Keckler, **Robert van de Geijn**, Kazushige Goto, Doug Burger. High Performance Dense Linear Algebra on a Spatially Distributed Processor. Proceedings of 2008 ACM SIGPLAN Symposium on Principles and Practices of Parallel Programming, Salt Lake City, Utah, February 2008.

27. Ernie Chan, Field G. Van Zee, Paolo Bientinesi, Enrique S. Quintana-Ortí, Gregorio Quintana-Ortí, and **Robert van de Geijn**. SuperMatrix: A Multithreaded Runtime Scheduling System for Algorithms-by-Blocks. Proceedings of 2008 ACM SIGPLAN Symposium on Principles and Practices of Parallel Programming, p. 123-132, Salt Lake City, Utah, February 2008.
28. Gregorio Quintana-Ortí, Enrique S. Quintana-Ortí, Ernie Chan, Field G. Van Zee, and **Robert A. van de Geijn**. Scheduling of QR factorization algorithms on SMP and multi-core architectures. Proceedings of the 16th Euromicro International Conference on Parallel, Distributed and network-based Processing, Toulouse, France, February 2008.
29. Ernie Chan, Field G. Van Zee, Enrique S. Quintana-Ortí, Gregorio Quintana-Ortí, **Robert van de Geijn**. Satisfying your Dependencies with SuperMatrix. Proceedings of IEEE Cluster Computing 2007, pp. 91–99, Austin, Texas, September 2007.
30. Bryan Marker, Field Van Zee, Kazushige Goto, Gregorio Quintana-Orti, **Robert van de Geijn**. Toward Scalable Matrix Multiply on Multithreaded Architectures. Proceedings of European Conference on Parallel and Distributed Computing (EuroPar07), pp. 748-757, Rennes, France, August 2007.
31. Ernie Chan, Enrique Quintana-Orti, Gregorio Quintana-Orti, and **Robert van de Geijn**. SuperMatrix Out-of-Order Scheduling of Matrix Operations for SMP and Multi-Core Architectures. SPAA'07: Proceedings of the Nineteenth ACM Symposium on Parallelism in Algorithms and Architectures. pp. 116-125. 2007.
32. Ernie Chan, William Gropp, Rajeev Thakur, and Robert van de Geijn. Collective communication on architectures that support simultaneous communication over multiple links. In PPoPP'06: Proceedings of the Eleventh ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming, pages 2-11, New York, NY, USA, March 29-31, 2006.
33. Paolo Bientinesi and **Robert van de Geijn**. Formal Correctness and Stability of Linear Algebra Algorithms. *Proceedings of IMACS05*, 2005.
34. Tze Meng Low, **Robert van de Geijn**, and Field Van Zee. Extracting SMP Parallelism for Dense Linear Algebra Algorithms from High-Level Specifications. *Proceedings of Principles and Practice of Parallel Processing 2005*, 2005.
35. John Gunnels, Fred Gustavson, Greg Henry, and **Robert A. van de Geijn**. A Family of High-Performance Matrix Multiplication Algorithms. *PARA 2004, LNCS 3732*, pp. 2256-265, 2005.
36. Paolo Bientinesi, John Gunnels, Fred Gustavson, Greg Henry, Margaret Myers, Enrique Quintana-Orti, and **Robert A. van de Geijn**. Rapid Development of High-Performance Linear Algebra Libraries. *PARA 2004, LNCS 3732*, pp. 376–384, 2005.
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65. Jack Dongarra, **Robert van de Geijn**, and David Walker. A look at scalable dense linear algebra libraries. In *Proceedings of Scalable High Performance Concurrent Computing '92*, April 27-29, 1992.
66. Jack Dongarra and **Robert van de Geijn**. A parallel dense linear solve library routine. In *Proceedings of the 1992 Intel Supercomputer Users' Group Meeting*, Oct. 1992.
67. E. Anderson, A. Benzoni, J. Dongarra, S. Moulton, S. Ostrouchov, B. Tourancheau, and **R. van de Geijn**. LAPACK for distributed memory architectures: Progress report. In *Proceedings of the Fifth SIAM Conference on Parallel Processing for Scientific Computing*, pages 625–630, Philadelphia, 1992. SIAM.
68. **R.A. van de Geijn**. Storage schemes for parallel eigenvalue algorithms. In G.H. Golub and P. van Dooren, editors, *Numerical Linear Algebra, Digital Signal Processing and Parallel Algorithms*, pages 639–648. NATO ASI Series, Springer Verlag, 1991.
69. **R.A. van de Geijn**. Efficient global combine operations. In *Sixth Distributed Memory Computing Conference Proceedings*, pages 291–294. IEEE Computer Society Press, 1991.
70. A. Benzoni, V. S. Sunderam, and **R.A. van de Geijn**. Matrix factorization on a IBM RISC System/6000 workstation network. In *Proceedings of the Second Symposium on High Performance Computing, Montpellier, France*, 1991.
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72. **R.A. van de Geijn**. Machine independent parallel numerical algorithms. In G.F. Carey, editor, *Parallel Supercomputing: Methods, Algorithms and Applications*, chapter 3, pages 33–44. Wiley, 1989.
73. **R.A. van de Geijn** and D.G. Hudson. An efficient parallel implementation of the nonsymmetric QR algorithm. In *Proceedings of the Fourth Conference on Hypercube Concurrent Computers and Applications*, 1989.
74. J.W. Juszczak and **R.A. van de Geijn**. An experiment in coding portable parallel matrix algorithms. In *Proceedings of the Fourth Conference on Hypercube Concurrent Computers and Applications*, 1989.
75. D.P. O'Leary, G.W. Stewart, and **R.A. van de Geijn**. Domino: A transportable system for parallel processing. In Arthur Wouk, editor, *Parallel Processing and Medium-Scale Multiprocessors*. SIAM, 1989.

Articles in Newsletters

1. **Robert van de Geijn** and Maggie Myers. "Teaching Numerical Linear Algebra Online." SIAM News, September 2020.
2. Field Van Zee, **Robert van de Geijn**, Maggie Myers, Devangi Parikh, and Devin Matthews. BLIS: BLAS and So Much More. SIAM News, April 2021.

Dissertation and Thesis Supervision

Ph.D. Dissertations Supervised

1. Michael Barnett, Ph.D. in Computer Science, August 1992. "A Systolizing Compiler." Co-supervised with Chris Lengauer.
2. Timothy Collins, Ph.D. in Computer Science, August 1995. "Efficient Matrix Computations Through Hierarchical Type Specifications." Co-supervised with J.C. Browne.
3. H. Carter Edwards, Ph.D. in Computational and Applied Mathematics, May 1997. "A Parallel Infrastructure for Scalable Adaptive Finite Element Methods and its application to Least Squares C-infinity Collocation." Co-supervised with Linda Hayes and Mary Wheeler.
4. John A. Gunnels, Ph.D. in Computer Science, Fall 2001. "A Systematic Approach to the Design and Analysis of Linear Algebra Algorithms."
5. James Overfelt, Ph.D. in Computational and Applied Mathematics, Spring 2002. "A Rapid Solution Methods for Stokesian Emulsions." Co-supervised with Greg Rodin.
6. Paolo Bientinesi, Ph.D. in Computer Science, Spring 2006 "Automatic Derivation, Implementation, and Analysis of Linear Algebra Algorithms."
7. Ernie Chan, Ph.D. in Computer Science, Summer 2010 "Application of Dependence Analysis and Runtime Data Flow Graph Scheduling to Matrix Computations."
8. Kyungjoo Kim, Ph.D. in Engineering Mechanics, Summer 2013. "Finite Element Modeling of Electromagnetic Radiation and Induced Heat Transfer in the Human Body." Co-supervised with Leszek Demkowicz and Victor Eijkhout.
9. Ardavan Pedram, Ph.D. in Electrical and Computer Engineering, Summer 2013. "Algorithm/Architecture Codesign of Low Power and High Performance Linear Algebra Compute Fabrics." Ph.D. Dissertation. The University of Texas at Austin, Department of Electrical and Computer Engineering. Aug 2013. Co-supervised with Andreas Gerstlauer.
10. Tze Meng Low, Ph.D. in Computer Science, Dec. 2013. "A Calculus of Loop Invariants for Dense Linear Algebra Optimization ."
11. Bryan Marker, Ph.D. in Computer Science, May 2014. "Design by Transformation: From Domain Knowledge to Optimized Program Generation." Co-supervised with Don Batory.
12. Martin Schatz, Ph.D. in Computer Sciences, Summer 2015. "Distributed Memory Tensor Computations: Formalizing Distributions, Redistributions, and Algorithm Derivation." Co-supervised with Tamara Kolda.
13. Tyler Smith, Ph.D. in Computer Science, "Theory and Practice of Classical Matrix-Matrix Multiplication for Hierarchical Memory Architectures." Co-supervised with Enrique Quintana-Orti.
14. Chen-Han Yu. Ph.D. in Computer Science, "The science of high performance algorithms for hierarchical matrices. Co-upervised with George Biros.
15. Jianyu Huang . Ph.D. in Computer Science. "Practical fast matrix multiplication algorithms."
16. Field Van Zee. Ph.D. in Computer Science.
17. Christos Psarras. Ph.D. in Computational Engineering Science, RWTH Aachen University. Co-supervised with Paolo Bientinesi. In progress.

Masters Theses Supervised

1. James Juszczak, Masters in Computer Science, Masters thesis option, Fall 1989 "Parallel Matrix Computations." James is currently Supervisor of Application Development/Strategic Products with Exxon/Mobil.
2. Lance Shuler, Masters of Mathematics, Masters paper option, Fall 1992. "A Search for LAPACK Condition Number Counterexamples." Lance is currently a Senior Software Engineer with Intel.
3. Martin Hoff, Masters of Mathematics, Masters paper option, Spring 1993. "The Use of Jacobi Methods for Computing Eigenvalues of Real Symmetric Matrices."
4. Kenneth Klimkowski, Masters of Computational and Applied Mathematics, Thesis option, Spring 1997. "Application of an Approximate Hierarchical Method to a Parallel Matrix-Vector Product for a Non-Laplacian Operator."

Undergraduate Theses Supervised

1. Jerrell Watts, Honors Thesis in Computer Science, Spring 1994. "Efficient Collective Communication on Multidimensional Meshes with Worm-Hole Routing."
2. Scott Matthews, Honors Thesis in Computer Science, Spring 1994. "Implementation of Monte Carlo Methods in Biological Data Analysis."
3. Darin Greene, Honors Thesis in Computer Science, Spring 1995. "Robustness of Collective Communication Algorithms."
4. Thierry Joffrain, Honors Thesis in Computer Science, Spring 1998. "Parallel Implementation of Triangular Solve."
5. Wesley Reiley, Honors Thesis in Computer Science, Spring 2000. "Efficient Parallel Out-of-Core Implementation of the Cholesky Factorization."
6. Marcel Heimlich, Honors Thesis in Computer Science, Summer 2003. "On Optimizing collective Communication."
7. Ernie Chan, Honors Thesis in Computer Science, Spring 2004. "On Optimizing collective Communication."
8. Bryan Marker, Turing Scholars Thesis in Computer Science, Spring 2007. "On Composing Matrix Multiplication from Kernels."
9. Tyler Rhodes, Turing Scholars Thesis in Computer Science, 2011. "Deriving Algorithms for the Triangular Time-Continuous Lyapunov Equation."
10. James Levitt, Dean's Scholars Honors Thesis in Computer Science, Spring 2013. "Adding Aggressive Early Deflation to the Restructured Symmetric QR Algorithm."
11. Kevin Jia, Dean's Scholars Honors Thesis in Computer Science, Fall 2013. "Improving Data Locality of the Nonsymmetric QR Algorithm."
12. Karen Tsai, Turing Scholars Thesis in Computer Science, Spring 2015. "On Configuring Distributed Memory Process Grids for Tensor Contraction Applications."
13. Zhoasong Zhang, Turing Scholars Thesis in Computer Science, Spring 2021. "A Bayesian Approach Towards Fair and Flexible Assessment Generation." Co-supervised with Maggie Myers.

Recent Corporate Gifts

1. AMD. Period: 2021–. Amount: $100,000.
2. Arm. Period: 2020–. Amoount: $90,000.
3. Oracle. Period: 2020–. Amount: $90,000.

4. Oracle. Period: 2019–. Amount: $80,000.
5. Oracle. Period: 2018–. Amount: $80,000.
6. Facebook. Period: 2019–. Amount: $50,000.
7. Qualcomm. Period: 1/2017–. Amount: $100,000.
8. MathWorks. Period: 3/2016-6/2017. Amount: $40,000.
9. Intel® Parallel Computing Center. Period: 2016–. Amount: $100,000.
10. Intel® Parallel Computing Center. Period: 2017–. Amount: $100,000.
11. Hewlett Packard. Period: ??. Amount: $50,000.
12. AMD. Period: 2015–. Amount: $50,000.
13. Texas Instruments. Period: 2014–. Amount: $20,000.
14. Microsoft. Period: 2008-2011. Amount: $490,000. (Estimate.)

Recent Research Grants

1. **Robert van de Geijn** (PI), Margaret E. Myers (CoPI), Field Van Zee (CoPI), Devangi Parikh (CoPI). Award CSSI-2003921: "Collaborative Research: Frameworks: Beyond the BLAS: A framework for accelerating computational and data sience. " Performance Period: 2020-2023. Amount:$812,680. In collaboration with Devin Matthews at SMU. Funded May. 1, 2020 - April 30, 2023.
2. **Robert van de Geijn (PI)**, Margaret E. Myers (CoPI), Field Van Zee (CoPI). Award CCF-1714091: "SHF: Small: Making Strassen's Algorithm Practical." Performance period: Aug. 1, 2017 - July 31, 2020. Amount: $465,884.
3. **Robert van de Geijn (PI)**, Don Batory (CoPI), John Stanton (CoPI), Victor Eijkhout (CoPI), Margaret Myers (CoPI): NSF Award ACI-1550493 for "Collaborative Research: SI2-SSI: Sustaining Innovation in the Linear Algebra Software Stack for Computational Chemistry and other Sciences." Performance period: July 15, 2016 - June 30, 2018. Amount: $750,983.
4. **Robert van de Geijn (PI)** and Margaret Myers (CoPI). University of Texas System grant for "UTx: Linear Algebra for Computer Scientists." Performance period: June 2013 - June 2015. Amount: $150,000.
5. **Robert van de Geijn (PI)**: "Sandia National Laboratories/University Of Texas At Austin Excellence In Computational Sciences Research Program (Martin Schatz)." Performance period: Sept. 1, 2014 - May 31, 2015. Amount: $40,000.
6. Don Batory (PI) and **Robert van de Geijn (CoPI**): NSF Award CCF 1421211 for "SHF:Small: Generation of Scientific Software Libraries." Performance period: July 15, 2014 - June. 30, 2017. Amount: $515,517.
7. George Biros (PI), Andreas Gerstlauer (CoPI), Lizy John (CoPI), and **Robert van de Geijn (CoPI)**: NSF Award CCF 1337393 for "XPS: DSD: A2Ma: Algorithms And Architectures For Multiresolution Applications." Performance period: Oct. 1, 2013 - Sept. 30, 2016. Amount: $749,801.
8. **Robert van de Geijn (PI)** and Field Van Zee (CoPI): NSF Award CCF-1320112 for "SHF: Small: From Matrix Computations To Tensor Computations." Performance period: Aug. 1, 2013 - July 31, 2016. Amount: $347,999.00.

9. **Robert van de Geijn (PI)**, Don Batory (CoPI), John Stanton (CoPI), Victor Eijkhout (CoPI), Margaret Myers (CoPI): NSF Award ACI-1148125 for "Collaborative Research: SI2-SSI: A Linear Algebra Software Infrastructure for Sustained Innovation in Computational Chemistry and other Sciences." Performance period: June 1 2012 - May 31 2016. Amount: $1,701,189.00.

10. Andreas Gerstlauer (PI), **Robert van de Geijn (CoPI)**: NSF Award CCF-1218483 for "SHF: Small: Algorithm/Architecture Co-Design of Low Power and High Performance Linear Algebra Compute Fabrics." Performance period: June 1 2012 - May 31 2016. Amount: $499,919.

11. Ali Yilmaz (PI), Victor Eijkhout (CoPI), Leszek Demkowidz (CoPI), **Robert van de Geijn (CoPI)**, and John Pearce (CoPI): NSF Award OCI-0904907 for "High-Fidelity Simulation of Bioelectromagnetic Effects on the Human Body with Petascale Computers." Performance period: Sept. 1 2009- Aug. 31 2015. Amount: $1,400,000.

12. **Robert van de Geijn (PI)**, Victor Eijkhout (CoPI), and Calvin Lin (CoPI): NSF Award CCF-0917167 for "SHF: Small: Transforming Linear Algebra Libraries." Performance period: Sept 1, 2009 - Aug. 31, 2012. Amount: $400,000;

13. Victor Eijkhout (PI) and **Robert van de Geijn (CoPI)**: NSF Award CCF-0917096 for "SHF: Small:Toward mechanical derivation of Krylov space algorithms." Performance Period Aug 15, 2009 - July 31, 2012. Amount: $473,123;

14. **Robert van de Geijn (PI)**, Victor Eijkhout (CoPI): NSF Award OCI-0850750 for "Collaborative Research: Mechanical Transformation of Knowledge to Libraries." Performance period: June 1, 2009 - May 31, 2011. Amount: $330,000;

15. **Robert van de Geijn (PI)** and Kazushige Goto (CoPI): NSF Award CCF-0702714 for "Foundations and Applications of Hierarchically Stored Matrices." Performance period: May 15 2007-April 30 2010. Amount: $275,000;

16. Victor Eijkhout (PI) and **Robert van de Geijn (CoPI)**: NSF Award DME-0625917 for "Sparse Direct Solvers for Unassembled Hyper-Matrices." Performance period: Sept. 1 2006-Aug. 31 2009. Amount: $396,687.

17. **Robert van de Geijn (PI)** and Kazushige Goto (CoPI): NSF Award CCF-0540926 for "Foundations of Programming Linear Algebra Algorithms on SMP and Multicore Systems." Performance period: Feb. 1 2006-Jan. 31 2009. Amount: $399,999;

18. **Robert van de Geijn (PI)**: NSF Award CCF-0342369 for " Automatic Tools for Deriving, Analyzing, and Implementing Linear Algebra Libraries." Performance period: March 1 2004-Feb. 28 2007. Amount: $299,999.

19. **Robert van de Geijn (PI)** (collaboration with Anthony Skjellum): NSF Award ACI-0305163 for "ALGORITHMS: Collaborative Research: A Systematic Approach to the Derivation, Representation, Analysis, and Correctness of Dense and Banded Linear Algebra Algorithms for HPC Architectures." Performance period: Aug. 2003-July 2006; Amount: $238,259.

20. **Robert van de Geijn** (collaboration with Anthony Skjellum): NSF Award ACI-0203685 for "ALGORITHMS: Collaborative Research: New Contributions to the Theory and Practice of Programming Linear Algebra Libraries." Performance period: 7/1/02-6/31/03; Amount: $35,000.