Martin Bastiaan van Gijzen

Professor

July 13, 2022

Delft University of Technology, DIAM
P.O. Box 5031
2600 GA Delft, The Netherlands
Homepage: `http://homepage.tudelft.nl/1w5b5/`

Telephone: +31(0)15 278 2519
Fax: +31(0)15 278 7295
E-mail: M.B.vanGijzen@TUDelft.nl

RESEARCH INTERESTS

Numerical Linear Algebra. High-Performance Computing. Data Science.

EDUCATION

Ph.D. in Applied Mathematics. Delft University of Technology, Delft, The Netherlands. March 28, 1994. Dissertation: *Iterative Solution Methods for Linear Equations in Finite Element Computations*. Affiliated to the Department of Computational Mechanics, TNO Building and Construction Research (now DIANA FEA) (1989-1993). Promotor(Advisor): Prof. Dr. Henk A. van der Vorst. Co-supervisor: Prof. Dr. Kees Vuik.

M.Sc. in Applied Mathematics. Delft University of Technology, Delft, The Netherlands, 1989. Thesis: *Iterative Solution Methods for Linear Systems Arising from Finite Element Discretization*. Supervisor: Prof. Dr. Henk A. van der Vorst.

CAREER

July 2021 - present: Professor, Delft University of Technology.
Research subjects: High-Performance Computing, Numerical Linear Algebra, Computational Imaging, Numerical Modeling.

2008 - July 2021: Associate Professor, Delft University of Technology.
Educational tasks: Lecturing (30 % of the time), supervision of Bachelor and Master projects, advisor of Ph.D. students and postdoctoral researchers
Management tasks: Director of Education for the Master's in Applied Mathematics (M.Sc. AM, since March 1, 2021), Coordinator of the M.Sc. AM (2012 through February 28, 2021), Project coordination, acquisition of external funding, chairman of the

admission committee for the M.Sc. AM, coordinator of the bridging programme for the M.Sc. AM, participation in promotional activities for the M.Sc. AM, participation in the accreditation procedure of the M.Sc. AM, regular member of search committees.

2004 - 2008: Assistant Professor, Delft University of Technology
Research subjects: Numerical linear algebra, parallel and grid computing, numerical modeling.
Educational tasks: Lecturing (50 % of the time), supervision of Bachelor and Master projects, advisor of Ph.D. students, participation in promotional activities (Open dagen, Wiskunde in Actie).
Management tasks: Project coordination, acquisition of external funding, member of the organizing committee of the NMC2006 conference, organiser of a one day symposium at the occasion of a visit of Prof. Gene Golub, member of the organising committee of the farewell symposium of Prof. Piet Wesseling, member of the search committee for two new assistant professors in the numerical analysis group, participation in the accreditation procedure for the Bachelor's in Applied Mathematics.

2002 - 2004: Senior Scientist, European Center for Research and Training in Scientific Computing, (CERFACS from its name in French), Toulouse, France
Research subjects: Numerical linear algebra, massively parallel computing, numerical modeling.
Educational tasks: Supervision of trainees and of a Ph.D. student.
Management tasks: Acquisition of external funding (mainly EC-projects), member of the comité d'entreprise, occasional replacement of the team leader, organization of the CERFACS wide interest seminars, co-organization of the Sparse Days 2004.

1997 - 2002: Senior Scientist/Project leader, TNO Physics and Electronics Laboratory, The Hague, The Netherlands.
Research subjects: Underwater communication, signals processing, equalization, study of underwater environment, organization of sea experiments, data analysis and data management.
Educational tasks: Supervision of trainees, occasionally invited lecturer (ENSIETA, Delft University of Technology).
Management tasks: Leader of international research projects, supervision of project employees and project budget, acquisition, definition, and planning of new projects, representation of TNO at (international) meetings and maintaining and extending a network of national and international contacts.

1994 - 1996: Post-doctoral Researcher, Utrecht University, Utrecht, the Netherlands.
Research subjects: Massively Parallel Computing, simulation of global ocean circulation, computational acoustics, numerical mathematics.
Educational tasks: Lecturing (about 20% of the time), (co-)supervision of master research students, promotional activities for the university (visiting secondary schools, giving presentations at 'Open dagen' for high school students and teachers, articles in popular magazines).

1989 - 1993: Junior Scientist, TNO Building and Construction Research.
Research subjects: Numerical mathematics, linear algebra, finite element method, mechanical engineering.

Educational task: (Co)-supervision of a master student.

PROFESSIONAL TRAINING

Dealing with Customers (I) (TNO, 1997); *Discrete Random Signals and Statistical Signal Processing* (Delft University of Technology, 1998); *Project Management* and *Employability* (TNO, 1998); *Underwater Acoustics and Sonar* (Birmingham University, U.K.) and *Dealing with Customers (II)* (TNO), 2000.

I have obtained the following teaching qualifications.

In France, I received the "Qualification aux Functions de Maître de Conférences" in 2004. This certificate allows me to work and teach at the level of Assistant Professor at the French Universities. The qualification is obtained on basis of an extensive dossier that includes a description and proofs of teaching and research experience. This dossier is evaluated by an independent committee on behalf of the French Ministry of Education.

In The Netherlands, I obtained my BKO (Dutch teaching qualification for higher education) in 2009.

As part of the BKO, I completed the following educational courses in Delft: *Active and Collaborative Learning* and *Assessment* (2005); *Supervision and assessment of individual students* (2006); *Working with Groups of International Students* (2007).

LANGUAGES

Dutch: native. English: fluent. French: good. German: good.

PROFESSIONAL SOCIETIES

Numeriek Wiskundig Genootschap.

Society for Industrial and Applied Mathematics (SIAM).

AWARDS

STW Open Mind Award, 2016.

Best Teacher Award in Applied Mathematics, 2010.

Elected among the three best project leaders of TNO-FEL (out of several hundreds), 2001.

RESEARCH

Funded Proposals

2021. Agency: **NWO**. Project: *The Global South as Test-Bed for New Innovations*. Budget: 5,000 Euros. Partner.

2018. Agency: **Chinese Scholarship Council (CSC)**. Project: *Computational Techniques for PDE-Based Image Processing*. Two year funding for a visiting Ph.D. student from Harbin University, China.

2018. Agency: **Scientific and Technological Research Council of Turkey**. Project: *Development of New Efficient Solution Techniques for Solving Large and Ill-Conditioned Least-Squares Problems that Originate from Measurements of the Earth Gravity Field*. Budget: Postdoctoral Researcher salary for one year for a one-year visit by a Turkish researcher.

2017. Agency: **STW**. Project: *IMSYS-3D*. Budget: Postdoctoral Researcher salary for three years. Co-applicant.

2017. Agency: **NWO-WOTRO**. Project: *A Sustainable MRI System to Diagnose Hydrocephalus in Uganda*. Budget: 500,000 Euros of which half is for the consortium partners Mbarara University for Science and Technology (Uganda), Pennsylvania State University (U.S.A.), and Leiden University Medical Center (The Netherlands). Main applicant and coordinator.

2016. Agency: **STW Open Mind**. Project: *An Inexpensive and Sustainable MRI System to Diagnose Hydrocephalus in Developing Countries*. Budget: 50,000 Euros. Main applicant and coordinator.

2012. Sponsor: **Shell**. Project: *Fast Iterative Solution of the Time-Harmonic Elastic Wave Equation at Multiple Frequencies*. Budget: 430,000 Euros. Main applicant.

2012. Agency: **European Space Agency (ESA-ESTEC)**. Project: *Thermodynamics and Transport of an Atomic Hydrogen Plasma*. Budget: 25,000 Euros. Subcontractor.

2011. Agencies: **Japanese Society for the Promotion of Science** and **NWO**, the Dutch Research Council. Project: Workshop *Numerical Linear Algebra - Algorithms, Applications, and Training*. Budget: 4,000 Euros. Main applicant.

2006. Agency: **Delft Centre for Computational Science and Engineering (DCSE)**. Project: *Development of an Immersed Boundary Method, Implemented on Cluster and Grid Computers with Application to the Swimming of Fishes*. Budget: Ph.D. student salary for four years (approximately 200,000 Euros). Main applicant.

2003. Agency: **Institut Français, Van Gogh Program**, a French-Dutch Van Gogh Program to foster collaboration between French and Dutch research groups. Budget: 10,000 Euros. Main applicant.

2000. Agencies: **Ministry of Defense, TNO Central, Ministry of Infrastructure**. Project: *ACME* on underwater communication. Budget for TNO: approximately 800,000 Euros. Main applicant.

2000. Agency: **European Community Research Council**. Project: *ACME* on underwater communication. Budget for TNO: 635,000 Euros. Co-applicant.

PUBLICATIONS

Book

C. Vuik, F.J. Vermolen, M.B. van Gijzen, and M.J. Vuik.
Numerical Methods for Ordinary Differential Equations.
ISBN 9789065623737, DAP/VSSD, Delft, 2015.

In Journals

46. M.L. de Leeuw den Bouter and G. Ippolito and T.P.A. O'Reilly and R.F. Remis and M.B. van Gijzen and A.G. Webb.
Deep Learning-Based Single Image Super-Resolution for Low-Field MR Brain Images. *Scientific Reports*, 12, Article 6362, 2022.

45. X. Shan and M.B. van Gijzen.
Deflated Preconditioned Conjugate Gradient Methods for Noise Filtering of Low-Field MR Images. *Journal of Computational and Applied Mathematics*, 400, Article 113730, 2022.

44. E. Ahishakiye, M.B. van Gijzen, J. Tumwiine, R. Wario, and J. Obungoloch.
A Survey on Deep Learning in Medical Image Reconstruction. *Intelligent Medicine*, 1(3):118-127, 2021.

43. Y. Qiu, M.B. van Gijzen, J.-W. van Wingerden, M. Verhaegen, and C. Vuik.
Preconditioning Navier-Stokes Control Using Multilevel Sequentially Semiseparable Matrix Computations. *Numerical Linear Algebra with Applications*, 228(2):e2349, 2021.

42. M. de Leeuw den Bouter, M.B. van Gijzen, and R.F. Remis.
Low-Field Magnetic Resonance Imaging Using Multiplicative Regularization. *Magnetic Resonance Imaging*, 75:21-33, 2021.

41. M. Pari, W. Swart, M.B. van Gijzen, M.A.N. Hendriks, and J.G. Rots.
Two Solution Strategies to Improve the Computational Performance of Sequentially Linear Analysis for Quasi-brittle Structures. *International Journal for Numerical Methods in Engineering*, 121(10):2128-2146, 2020.

40. E. Ahishakiye, M.B. van Gijzen, J. Tumwiine, and J. Obungoloch.
Adaptive-Size Dictionary Learning Using Information Theoretic Criteria for Image Reconstruction from Undersampled k-space Data in Low Field Magnetic Resonance Imaging. *BMC Medical Imaging*, 20(1):1-12, 2020.

39. M.L. de Leeuw den Bouter, M.B. van Gijzen, and R.F. Remis.
Conjugate Gradient Variants for L_p-regularized Image Reconstruction in Low-Field MRI. *SN Applied Sciences*, 1, article 1736, 2019.

38. A. Vijn, E. Lepelaars, J. Dubbeldam, M. van Gijzen, and A. Heemink
    Magnetic Susceptibility Estimation for Magnetostatics. *IEEE Transactions on Magnetics* 55(3):1-9, 2019.

37. R. Astudillo, J.M. de Gier, and M.B. van Gijzen.
    Accelerating the Induced Dimension Reduction Method Using Spectral Information. *Journal of Computational and Applied Mathematics* 345:33-47, 2019.

36. M. Baumann and M.B. van Gijzen.
    An Efficient Two-Level Preconditioner for Multi-frequency Wave Propagation Problems. *Applied Numerical Mathematics*, 135:316-332, 2019.

35. M. Baumann and M.B. van Gijzen.
    Convergence and Complexity Study of GMRES Variants for Solving Multi-frequency Elastic Wave Propagation Problems. *Journal of Computational Science*, 26:285-293, 2018.

34. M. Baumann, R. Astudillo, Y. Qiu, E.Y.M. Ang, M.B. van Gijzen, and R.É. Plessix.
    An MSSS-Preconditioned Matrix Equation Approach for the Time-Harmonic Elastic Wave Equation at Multiple Frequencies. *Computational Geosciences*, 22(1):43-61, 2018.

33. Y. Qiu, M.B. van Gijzen, J.W. van Wingerden, M. Verhaegen, and C. Vuik.
    Evaluation of Multilevel Sequentially Semiseparable Preconditioners on Computational Fluid Dynamics Benchmark Problems Using Incompressible Flow and Iterative Solver Software. *Mathematical Methods in the Applied Sciences*, 41(3):888-903, 2018.

32. E.C.H. van Dongen, N. Kirchner, M.B. van Gijzen, R.S.W. van De Wal, T. Zwinger, G. Cheng, P. Lötstedt, and L. Von Sydow.
    Dynamically Coupling Full Stokes and Shallow Shelf Approximation for Marine Ice Sheet Flow Using Elmer/Ice (v8. 3). *Geoscientific Model Development*, 11(11):4563-4576, 2018.

31. M.I. Ahmad, D.B. Szyld, and M.B. van Gijzen.
    Preconditioned Multishift BiCG for $\mathcal{H}_\in$- Optimal Model Reduction. *SIAM Journal on Matrix Analysis and Applications*, 38(2):401-424, 2017.

30. R. Gupta, D. Lukarski, M.B. van Gijzen, and C. Vuik.
    Evaluation of the Deflated Preconditioned CG Method to Solve Bubbly and Porous Media Flow Problems on GPU and CPU. *International Journal for Numerical Methods in Fluids*, 80(11):666-683, 2016.

29. R. Astudillo and M.B. van Gijzen.
    A Restarted Induced Dimension Reduction Method to Approximate Eigenpairs of Large Unsymmetric Matrices. *Journal of Computational and Applied Mathematics*, 296:24-35, 2016.

28. M. Baumann and M.B. van Gijzen.
    Nested Krylov Methods for Shifted Linear Systems. *SIAM Journal on Scientific Computing*, 37(5):S90-S112, 2015.

27. A. Sangers and M.B. van Gijzen.
    The Eigenvectors Corresponding to the Second Eigenvalue of the Google Matrix and their Relation to Link Spamming. *Journal of Computational and Applied Mathematics*, 277:192-201, 2015.

26. Y. Qiu, M.B. van Gijzen, J.W. van Wingerden, M. Verhaegen, and C. Vuik.
    Efficient Preconditioners for PDE-Constrained Optimization Problem with a Multi-level Sequentially Semiseparable Matrix Structure. *Electronic Transactions on Numerical Analysis*, 44:367-400, 2015.

25. M.B. van Gijzen, G.L.G. Sleijpen, and J.-P.M. Zemke.
    Flexible and Multi-shift Induced Dimension Reduction Algorithms for Solving Large Sparse Linear Systems. *Numerical Linear Algebra with Applications*, 22(1):1-25, 2015.

24. F.J. Lingen, P.G. Bonnier, R.B.J. Brinkgreve, M.B. van Gijzen, and C. Vuik.
    A Parallel Linear Solver Exploiting the Physical Properties of the Underlying Mechanical Problem. *Computational Geosciences*, 18(6):913-926, 2014.

23. T.B. Jönsthövel, M.B. van Gijzen, C. Vuik, and A. Scarpas.
    On the Use of Rigid Body Modes in the Deflated Preconditioned Conjugate Gradient Method. *SIAM Journal on Scientific Computing*, 35(1):B207-B225, 2013.

22. T.B. Jönsthövel, M.B. van Gijzen, S. MacLachlan, C. Vuik, and A. Scarpas.
    Comparison of the Deflated Preconditioned Conjugate Gradient Method and Algebraic Multigrid for Composite Materials. *Computational Mechanics*, 50(3):321-333, 2012.

21. T.P. Collignon and M.B. van Gijzen.
    Fast Iterative Solution of Large Sparse Linear Systems on Geographically Separated Clusters. *The International Journal of High Performance Computing Applications*, 25(4):440-450, 2011.

20. M.B. van Gijzen and P. Sonneveld.
    Algorithm 913: An Elegant IDR(s) Variant that Efficiently Exploits Biorthogonality Properties. *ACM Transactions on Mathematical Software*, 38(1), article 5, 19 pages, 2011.

19. T.P. Collignon and M.B. van Gijzen.
    Minimizing Synchronization in IDR(s). *Numerical Linear Algebra with Applications*, 18(5):805-825, 2011.

18. G.L.G. Sleijpen, P. Sonneveld, and M.B. van Gijzen.
    Bi-CGSTAB as an Induced Dimension Reduction Method. *Applied Numerical Mathematics*, 60(11):1100-1114, 2010.

17. G.L.G. Sleijpen and M.B. van Gijzen.
    Exploiting BiCGstab(ℓ) Strategies to Induce Dimension Reduction. *SIAM Journal on Scientific Computing*, 32(5):2687-2709, 2010.

16. T.P. Collignon and M.B. van Gijzen.
    Two Implementations of the Preconditioned Conjugate Gradient Method on Heterogeneous Computing Grids. *International Journal of Applied Mathematics and Computer Science*, 20(1):109-121, 2010.

15. T.B. Jönsthövel, M.B. van Gijzen, C. Vuik, C. Kasbergen, and A. Scarpas.
Preconditioned Conjugate Gradient Method Enhanced by Deflation of Rigid Body
Modes Applied to Composite Materials. *Computer Modeling in Engineering and Sciences*, 47(2):97-118, 2009.

14. P. Sonneveld and M.B. van Gijzen.
IDR(s): A Family of Simple and Fast Algorithms for Solving Large Nonsymmetric
Systems of Linear Equations. *SIAM Journal on Scientific Computing*, 31(2):1035-1062, 2008.

13. C. Sensiau, F. Nicoud, M. van Gijzen, and J.W. van Leeuwen.
A Comparison of Solvers for Quadratic Eigenvalue Problems from Combustion. *International Journal for Numerical Methods in Fluids*, 56(8):1481-1487, 2008.

12. M.B. van Gijzen, Y.A. Erlangga, and C. Vuik.
Spectral Analysis of the Discrete Helmholtz Operator Preconditioned with a Shifted
Laplacian. *SIAM Journal on Scientific Computing*, 29(5):1942-1958, 2007.

11. F. Chaitin-Chatelin and M.B. van Gijzen.
Analysis of Parameterized Quadratic Eigenvalue Problems in Computational Acoustics with Homotopic Deviation Theory. *Numerical Linear Algebra with Applications*, 13(6):487-512, 2006.

10. D. Loghin, M. van Gijzen, and E. Jonkers.
Bounds on the Eigenvalue Range and on the Field of Values of Non-Hermitian and Indefinite Finite Element Matrices. *Journal of Computational and Applied Mathematics*, 189(1-2):304-323, 2006.

 9. J. van Den Eshof, G.L.G. Sleijpen, and M.B. van Gijzen. Relaxation Strategies
for Nested Krylov Methods. *Journal of Computational and Applied Mathematics*, 177(2):347-365, 2005.

 8. M.B. van Gijzen.
The Parallel computation of the Smallest Eigenpair of an Acoustic Problem with
Damping. *International Journal for Numerical Methods in Engineering*, 45(6):765-777, 1999.

 7. J. Barkmeijer, F. Bouttier, and M.B. van Gijzen.
Singular Vectors and Estimates of the Analysis-Error Covariance Metric. *Quarterly Journal of the Royal Meteorological Society*, 124(549):1695-1713, 1998.

 6. M.B. van Gijzen, C.B. Vreugdenhil, and H. Oksuzoglu.
The Finite Element Discretization for Stream-Function Problems on Multiply Connected Domains. *Journal of Computational Physics*, 140(1):30-46, 1998.

 5. G.L.G. Sleijpen, H.A. van der Vorst, and M.B. van Gijzen.
Quadratic Eigenproblems Are No Problem. *SIAM News*, 29(7):8-9, 1996.

 4. M.B. van Gijzen.
Large Scale Finite Element Computations with GMRES-Like Methods on a CRAY
Y-MP. *Applied Numerical Mathematics*, 19(1-2):51-62, 1995.

3. M.B. van Gijzen.
A Polynomial Preconditioner for the GMRES Algorithm. *Journal of Computational and Applied Mathematics*, 59(1):91-107, 1995.

2. M.B. van Gijzen.
Conjugate Gradient-Like Solution Algorithms for the Mixed Finite Element Approximation of the Biharmonic Equation, Applied to Plate Bending Problems. *Computer Methods in Applied Mechanics and Engineering*, 121(1-4):121-136, 1995.

1. M.B. van Gijzen.
An Analysis of Element-by-Element Preconditioners for Nonsymmetric Problems. *Computer Methods in Applied Mechanics and Engineering*, 105(1):23-40, 1993.

In Refereed Conference Proceedings and Book Chapters

35. L. Steverink, T. Veugen, and M. van Gijzen.
Approximating Eigenvectors with Fixed-Point Arithmetic: A Step Towards Secure Spectral Clustering. In *Proceedings of the European Conference on Numerical Mathematics and Advanced Applications ENUMATH 2019*, Egmond aan Zee, The Netherlands. September 30-October 4, 2019. *Lecture Notes in Computational Science and Engineering*, 139:1129-1136, 2021.

34. M. de Leeuw den Bouter, M. van Gijzen, and R. Remis.
CG Variants for General-Form Regularization with an Application to Low-Field MRI. In *Proceedings of the European Conference on Numerical Mathematics and Advanced Applications ENUMATH 2019*, Egmond aan Zee, The Netherlands. September 30-October 4, 2019. *Lecture Notes in Computational Science and Engineering*, 139:673-681, 2021.

33. X. Shan and M. van Gijzen.
Deflated Preconditioned Conjugate Gradients for Nonlinear Diffusion Image Enhancement. In *Proceedings of the European Conference on Numerical Mathematics and Advanced Applications ENUMATH 2019*, Egmond aan Zee, The Netherlands. September 30-October 4, 2019. *Lecture Notes in Computational Science and Engineering*, 139:459-468, 2021.

32. F. van Doesum, J.C. Diehl, M. Bakker, M. van Gijzen, T. O'Reilly, I. Muhumuza, J. Obungoloch, and E. Mbabazi Kabachelor.
The Embodiment of Low-Field MRI for the Diagnosis of Infant Hydrocephalus in Uganda. In *Proceedings of the 2020 IEEE Global Humanitarian Technology Conference*, Seattle, Washington, U.S.A., October 29-November 1, pages 150-157, 2020.

31. M. de Leeuw den Bouter, D. Geçmen, A. Meijer, D. de Gans, L. Middelplaats, R. Remis, and M. van Gijzen.
Description of a Low-Field MRI Scanner Based on Permanent Magnets. In *Proceedings of the 10th Colour and Visual Computing Symposium CVCS2020*, Gjøvik, Norway and online, September 16-17, 2020. *CEUR Workshop Proceedings*, vol. 2688, paper 15, 2020.

30. E. Ahishakiye, M.B. van Gijzen, J. Tumwiine, and J. Obungoloch.
A Dictionary Learning Approach for Noise-Robust Image Reconstruction in Low-Field Magnetic Resonance Imaging. In *IST-Africa 2020 Conference Proceedings*, online, May 18-22, 2020. IST-Africa Institute and IIMC, 2020.

29. R. Astudillo and M.B. van Gijzen.
Induced Dimension Reduction Method to Solve the Quadratic Eigenvalue Problem. In *Proceedings of the International Conference on Numerical Analysis and its Applications NAA 2016*, Lotzenetz, Bulgaria, June 15-22, 2016. *Lecture Notes in Computer Science*, 10187:203-211, 2017.

28. M. Baumann and M.B. van Gijzen.
Efficient Iterative Methods for Multi-frequency Wave Propagation Problems: A Comparison Study. In *Proceedings of the International Conference on Computational Sci-*

ence, ICCS 2017, Zürich, Switzerland, June 12-14, 2017. *Procedia Computer Science*, 108:645-654, 2017.

27. R. Astudillo and M.B van Gijzen.
The Induced Dimension Reduction Method Applied to Convection-Diffusion-Reaction Problems. In *Proceedings of the European Conference on Numerical Mathematics and Advanced Applications ENUMATH 2015*, Ankara, Turkey, September 14-19, 2015. *Lecture Notes in Computational Science and Engineering*, 112:295-303, 2016.

26. R. Astudillo and M.B. van Gijzen.
Induced Dimension Reduction Method for Solving Linear Matrix Equations. In *Proceedings of the International Conference on Computational Science ICCS 2016*, San Diego, California, U.S.A., June 6-8, 2016. *Procedia Computer Science*, 80:222-232, 2016.

25. Y. Qiu, M.B. van Gijzen, J.W. van Wingerden, and M. Verhaegen.
On the Application of a Novel Model Order Reduction Algorithm for Sequentially Semi-separable Matrices to the Identification of One-Dimensional Distributed Systems. In *Proceedings of the 13th European Control Conference ECC14*, Strasbourg, France, June 24-27, 2014. *2014 European Control Conference (ECC)*, pages 2750-2755, IEEE, 2014.

24. R. Gupta, M.B. van Gijzen, and K. Vuik.
Multi-GPU/CPU Deflated Preconditioned Conjugate Gradient for Bubbly Flow Solver. In *Proceedings of the 22nd High Performance Computing Symposium HPC 2014*, Tampa, Florida, U.S.A., April 13-16, 2014. *HPC '14: Proceedings of the High Performance Computing Symposium* article 14, Society for Computing Simulation International, 2014.

23. R. Astudillo and M.B. van Gijzen.
An Induced Dimension Reduction Algorithm to Approximate Eigenpairs of Large Non-symmetric Matrices. In *Proceedings of the 11th International Conference of Numerical Analysis and Applied Mathematics ICNAAM 2013*, Rhodes, Greece, September 21-27, 2013. *AIP Conference Proceedings*, 1558(1):2277-2280, 2013.

22. Y. Qiu, M.B. van Gijzen, J.W. van Wingerden, and M. Verhaegen.
A Class of Efficient Preconditioners with Multilevel Sequentially Semiseparable Matrix Structure. In *Proceedings of the 11th International Conference of Numerical Analysis and Applied Mathematics ICNAAM 2013*, Rhodes, Greece, September 21-27, 2013. *AIP Conference Proceedings*, 1558(1):2253-2256, 2013.

21. R. Gupta, M.B. van Gijzen, and C. Vuik.
3D Bubbly Flow Simulation on the GPU-Iterative Solution of a Linear System Using Sub-domain and Level-Set Deflation. In *Proceedings of the 2013 21st Euromicro International Conference on Parallel, Distributed, and Network-Based Processing (PDP 2013)*, pages 359-366, Belfast, U.K., February 27-March 1, IEEE, 2013.

20. R. Gupta, M.B. van Gijzen, and C. Vuik.
Efficient Two-Level Preconditioned Conjugate Gradient Method on the GPU. In *Proceedings of High Performance Computing for Computational Science VECPAR 2012*, Kobe, Japan, July 17-20, 2012. *Lecture Notes in Computer Science*, 7851:36-49, 2013.

19. E. van't Wout, M.B. van Gijzen, A. Ditzel, A. van der Ploeg, and C. Vuik.
    The Deflated Relaxed Incomplete Cholesky CG Method for Use in a Real-Time Ship
    Simulator. In *Proceedings of the International Conference on Computational Science
    ICCS 2010*, Amsterdam, The Netherlands, May 31-June 2, 2010. *Procedia Computer
    Science*, 1(1):249-257, 2010.

18. P.A. van Heerbeek, M.B. van Gijzen, C. Vuik, and M.R. De La Fonteijne.
    Numerical Modelling of a Pulse Combustion Burner: Limiting Conditions of Stable
    Operation. In *Progress in Industrial Mathematics at ECMI 2008*, London, U.K., June
    30-July 4 2008. *Mathematics in Industry*, 15:875-880, 2010.

17. T.P. Collignon and M.B. van Gijzen.
    Solving Large Sparse Linear Systems Efficiently on Grid Computers Using an Asyn-
    chronous Iterative Method as a Preconditioner. In *Proceedings of the European Con-
    ference on Numerical Mathematics and Advanced Applications ENUMATH 2009*, Up-
    psala, Sweden, June 29-July 3, 2009. *Numerical Mathematics and Advanced Applica-
    tions 2009*, pages 261-268, Springer, 2010.

16. T.P. Collignon and M.B. van Gijzen.
    Parallel Scientific Computing on Loosely Coupled Networks of Computers. In B. Koren
    B. and K. Vuik (eds.), *Advanced Computational Methods in Science and Engineering.
    Lecture Notes in Computational Science and Engineering*, 71:79-106, 2009.

15. M.B. van Gijzen and Y.A. Erlangga.
    Convergence Bounds for Preconditioned GMRES Using Element-by-Element Esti-
    mates of the Field of Values. In *Proceedings of the European Conference on Compu-
    tational Fluid Dynamics ECCOMAS CFD 2006*, Egmond aan Zee, The Netherlands,
    September 5-8, 2006.

14. J. van Den Eshof, G.L.G. Sleijpen, and M.B. van Gijzen.
    Iterative Linear System Solvers with Approximate Matrix-Vector Products. In *Pro-
    ceedings of the Third International Workshop on Numerical Analysis and Lattice QCD*,
    Edinburgh, June-July 2003. *Lecture Notes in Computational Science and Engineering*,
    47:133-142, 2005.

13. G.L.G. Sleijpen, J. van den Eshof, and MB van Gijzen.
    Restarted GMRES with Inexact Matrix-Vector Products. In *Proceedings of Numerical
    Analysis and Its Applications NAA 2004*, Rousse, Bulgaria, June 29-July 3, 2004.
    Lecture Notes in Computer Science, 3401:494-5027, 2004.

12. L. Giraud and M.B. van Gijzen.
    Large Scale Acoustic Simulations on Clusters of SMPs. In C. Constanda, A. Largillier,
    and M. Ahues (eds.), *Integral Methods in Science and Engineering*, pages 61-66,
    Birkhauser, 2004.

11. M.B. van Gijzen.
    Two-Level Parallelism in a Stream-Function Model for Global Ocean Circulation. In
    Proceedings of the 9th European Conference on Parallel Processing Euro-Par 2003,
    Klagenfurt, Austria, August 26-29, 2003. *Lecture Notes in Computer Science*, 2790:820-
    829, 2004.

10. P.A. van Walree, M.B. van Gijzen, and M. Pattipeilohy.
    Acoustic Communication Experiments in the Westerschelde Shipping Lane Using Direct-Sequence Spread Spectrum Signals. In *Proceedings of the Sixth European Conference on Underwater Acoustics ECUA 2002*, pages 543-548, Gdańsk, Poland, June 24-27, 2002.

9. M.B. van Gijzen and P.A. van Walree.
   Shallow-Water Acoustic Communication with High Bit Rate BPSK Signals. In *Proceedings of Oceans 2000*, pages 1621-1624, Providence, RI, U.S.A., IEEE, 2000.

8. P.A. van Walree, M.B. van Gijzen, and D.G. Simons.
   Analysis of Shallow-Water Acoustic Communication Channel. In *Proceedings of the Fifth European Conference on Underwater Acoustics ECUA 2000*, pages 561-566, Villeurbane, France, 2000.

7. M.B. van Gijzen, P.A. van Walree, D. Cano, J.M. Passerieux, A. Waldhorst, R. Weber, and C. Maillard.
   The ROBLINKS Underwater Acoustic Communication Experiments. In *Proceedings of the Fifth European Conference on Underwater Acoustics ECUA 2000*, volume 1, pages 555-560, Villeurbane, France, 2000.

6. M.B. van Gijzen, P.A. van Walree, D. Cano, J.M. Passerieux, A. Waldhorst, and R. Weber.
   Advances in the ROBLINKS Project on Long-Range Shallow-Water Robust Acoustic Communication Links. In *Project Synopses of EurOCEAN 2000, the European Conference on Marine Science and Ocean Technology*, volume II, pages 589-599, Hamburg, Germany, August 29-September 2, 2000.

5. M.B. van Gijzen, G.L.G. Sleijpen, and A.J. van der Steen.
   The Data-Parallel Iterative Solution of the Finite Element Discretization of Stream-Function Models for Global Ocean Circulation. In *Proceedings of the 15th IMACS World Congress on Scientific Computation, Modelling and Applied Mathematics, Part III, Computational Physics, Biology, and Chemistry*, pages 479-484, August 24-29, Berlin, Germany, Wissenschaft and Technik Verlag, 1997.

4. M.B. van Gijzen.
   Parallel Ocean Flow Computations on a Regular and on an Irregular Grid. In *Proceedings of High-Performance Computing and Networking HPCN-Europe 1996*, Brussels, Belgium, April 15-19, 1996. *Lecture Notes in Computer Science*, 1067:207-212, 1996.

3. M.B. van Gijzen.
   Parallel Iterative Solution Methods for Linear Finite Element Computations on the Cray T3D. In *Proceedings of High-Performance Computing and Networking HPCN-Europe 1995*, Milan, Italy, May 3-5, 1995. *Lecture Notes in Computer Science*, 919:723-728, 1995.

2. M.B. van Gijzen.
   Clustering of Elements in EBE-Preconditioners. In *Proceedings of the First International Diana Conference on Computational Mechanics*, Delft, The Netherlands, October 24-25, 1994. *DIANA Computational Mechanics '94*, pages 297-306, Kluwer Academic Publishers, 1994.

1. M.B. van Gijzen and P. Nauta.
   An Element-by-Element Solution Algorithm for Nonsymmetric Linear Systems of Equations. In *Proceedings of the First National Mechanics Congress*, Rolduc, Kerkrade, The Netherlands, April 2–4, 1990. *Integration of Theory and Applications in Applied Mechanics*, pages 295-304, Kluwer Academic Publishers, 1990.

In Non-Refereed Conference Proceedings

7. M.B. van Gijzen and T.P. Collignon.
   Exploiting the Flexibility of IDR(s) for Grid Computing.
   In *Proceedings of the 2nd International Kyoto Forum on Krylov Subspace Methods*, Kyoto, Japan, 2010.

6. M.B. van Gijzen. An IDR(s) Variant with Minimal Intermediate Residual Norms.
   In *Proceedings of the 1st International Kyoto Forum on Krylov Subspace Methods*, pages 85-92, Kyoto, Japan, 2008.

5. M.B. van Gijzen and P. Sonneveld.
   The IDR(s) Method for Solving Nonsymmetric Systems: A Performance Study for CFD Problems.
   In *Proceedings of the Workshop on High Performance Algorithms for Computational Science and Their Applications*, Kyoto, Japan, 2007.

4. M.B. van Gijzen, Y.A. Erlangga, and C. Vuik.
   Estimation of the Optimal Shift for the Discrete Helmholtz Operator Preconditioned with a Shifted Laplacian. In *Proceedings of the Sixth International Congress on Industrial and Applied Mathematics ICIAM 2007*, Zürich, Switzerland, July 16-20, 2007. *Proceedings in Applied Mathematics and Mechanics (PAMM)*, 7(1):2020075-2020076, 2007.

3. Pieter van Heerbeek, Martin van Gijzen, Kees Vuik, and Marcel de la Fonteijne.
   Numerical Modeling of a Pulse Combustor. Limiting Conditions of Stable Operation. In *Proceedings of the COMBURA Symposium*, pages 49-50, Nieuwegein, The Netherlands, October 10, 2007.

2. Martin van Gijzen.
   Convergence Estimates for Preconditioned GMRES Using Element-by-Element Bounds on the Field of Values. In *Schnelle Löser für partielle Differentialgleigungen*, Mathematisched Forschungsinstitut Oberwolfach Report No. 24/2005, pages 1362-1365, Oberwolfach, Germany, 2005.

1. Daniel Cano, Martin van Gijzen, Andreas Waldhorst.
   Long Range Shallow Water Robust Acoustic Communication Links ROBLINKS. In *Proceedings of the Third European Marine Science and Technology Conference*, Volume III, pages 1133-1136, Lisbon, Portugal, 1998.

Theses

M.B. van Gijzen.
Iterative Solution Methods for Linear Equations in Finite Element Computations.
Ph.D. Thesis, Delft Institute of Applied Mathematics, Delft University of Technology, Delft, The Netherlands, 1994.

M.B. van Gijzen.
Iterative Solution Methods for Linear Systems Arising from Finite Element Discretization. Master's Thesis, Delft Institute of Applied Mathematics, Delft University of Technology, Delft, The Netherlands, 1989.

PRESENTATIONS (since 2002)

Plenary Lectures

5. *Preconditioners for Sequences of Shifted Linear Systems.*
   Preconditioning 2013, Oxford, June 19-21, 2013.

4. *The IDR Approach for Solving Large Nonsymmetric Linear Systems and Eigenvalue Problems.*
   Fifteenth International Congress on Computational and Applied Mathematics ICCAM 2010, Leuven, July 5-9, 2010.

3. *IDR(s) for Grid Computing.*
   2nd International Kyoto Forum on Krylov Subspace Methods, Kyoto, Japan, March 25-26, 2010.

2. *Variants of IDR(s).*
   1st International Kyoto Forum on Krylov Subspace Methods, Kyoto, Japan, September 10-11, 2008.

1. *IDR(s), A family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
   Workshop on High Performance Algorithms for Computational Science and their Applications, Kyoto, Japan, November 14-16, 2007.

Invited Lectures in Conferences

4. *Iterative Solvers on Geographically Separated Clusters.*
   Workshop "Synchronization-Reducing and Communication-Reducing Algorithms and Programming Models for Large-scale Simulations" at the Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, Rhode Island, U.S.A., January 9-13, 2012. **Fully funded by the organisers**.

3. *An Elegant IDR(s) Variant that Efficiently Exploits Bi-orthogonality Properties.*
   Householder Symposium XVIII, Lake Tahoe, Nevada, U.S.A., June 12-17, 2011.

2. *The IDR(s) Method for Solving Nonsymmetric Systems.*
   Householder Symposium, Zeuthen, Germany, June 2-6, 2008.

1. *Convergence Estimates for Preconditioned GMRES Using Element-by-Element Bounds on the Field of Values.* Oberwolfach Symposium, Oberwolfach, Germany, May 23-27, 2005.

Invited Lectures in Seminars

All international visits were fully or partly funded by the host.

28. *Imaging Algorithms for Low-Field MRI.*
    Shippensburg Universitya, Department of Mathematics Seminar, April 8, 2021 (remotely).

27. *Efficient Implicit Methods for PDE-Based Image Enhancement in Low-Field MRI.*
    University of Strathclyde Numerical Analysis e-seminar, October 6, 2020 (remotely).

26. *A Sustainable MRI System to Diagnose Hydrocephalus in Uganda.*
    Delft Global Initiative's Impact Day, Delft, The Netherlands, April 10, 2018.

25. *The IDR Method for Solving Large Nonsymmetric Linear Systems.*
    Uppsala Seminar Program in Scientific Computing, Uppsala, Sweden, November 9, 2016. Host: Nina Kirchner.

24. *Link Spamming and the Second Eigenvector of the Google Matrix.*
    CASA Colloquium, TU Eindhoven, Eindhoven, The Netherlands, May 8, 2013. Host: Barry Koren.

23. *IDR(s) for Grid Computing.*
    Seminar TU Hamburg-Harburg, Harburg, Germany, February 29, 2012. Host: Jens-Peter Zemke.

22. *Spectral Analysis of the Helmholtz Operator Preconditioned with a Shifted Laplacian.*
    Oxford/RAL seminar, Oxford, U.K., April 22, 2010. Host: Andrew Wathen.

21. *IDR(s), A Family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
    ICME seminar, Stanford University, Stanford, California, U.S.A., October 21, 2009. Host: Michael Saunders.

20. *Solving Linear Tomography Systems with Iterative Methods.*
    Vision lab seminar, Antwerp University, Antwerp, Belgium, March 10, 2009. Host: Joost Batenburg.

19. *IDR(s) and Multi-Orthogonal Polynomials.*
    Nijmegen University weminar, Nijmegen, The Netherlands, October 2, 2008. Host: Erik Koelink.

18. *IDR(s), A Family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
    Universidad Central de Venezuela, Caracas, Venezuela, January 21, 2008. Host: Marcos Raydan.

17. *IDR(s), A Family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
    Kyushu University, Fukuoka, Japan, November 19, 2007. Host: Seiji Fujino.

16. *Performance Modelling of a Mixed OpenMP/MPI Parallel Code for Oceanographic Calculations.*
    Kyushu University, Fukuoka, Japan, November 19, 2007. Host: Seiji Fujino.

15. *IDR(s), A Family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
    University of Tokyo, Tokyo, Japan, November 12, 2007. Host: Seiji Fujino.

14. *IDR(s), A Family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
    IMM seminar, DTU Denmark, Lyngby, Denmark, May 2, 2007. Host: Hans Bruun Nielsen.

13. *Spectral Analysis of the Discrete Helmholtz Operator Preconditioned with a Shifted Laplacian.*
    ALGO Team Seminar, CERFACS, Toulouse, France, January 11, 2007. Host: Iain Duff.

12. *Spectral Analysis of the Helmholtz Operator Preconditioned with a Shifted Laplacian.*
    Oxford/RAL seminar, Oxford, U.K., November 30, 2006. Host: Iain Duff.

11. *The Jacobi-Davidson Method for Nonlinear Eigenvalue Problems.*
    IMM seminar, DTU Denmark, Lyngby, Denmark, Augustus 28, 2006. Host: Per Christian Hansen.

10. *The Jacobi-Davidson Method for Nonlinear Eigenvalue Problems.*
    Université de Montpellier II, Montpellier, France, January 10, 2006. Host: Franck Nicoud.

9. *Bounds on the Eigenvalue Range and on the Field of Values of Non-Hermitian and Indefinite Finite Element Matrices.*
   IMM seminar, DTU Denmark, Lyngby, Denmark, August 9, 2005. Host: Per Christian Hansen.

8. *Convergence Estimates for Preconditioned GMRES Using Element-by-Element Bounds on the Field of Values.* DCSE, Delft University of Technology, Delft, The Netherlands, June 3, 2005.

7. *Bounds on the Eigenvalue Range and on the Field of Values of Non-Hermitian and Indefinite Finite Element Matrices.*
   University of Amsterdam, Amsterdam, The Netherlands, November 24, 2004: Host: Jan Brandts.

6. *Bounds on the Eigenvalue Range and on the Field of Values of Non-Hermitian and Indefinite Finite Element Matrices.*
   Wake Forest University, Winston-Salem, North Carolina, U.S.A., September 30, 2004. Host: Marielba Rojas.

5. *Two-Level Parallelism in a Stream-Function Model for Global Ocean Circulation.*
   Delft University of Technology, Delft, The Netherlands, February 24, 2004. Host: Kees Vuik.

4. *Solution Methods for Block Systems from Oceanography.*
   Utrecht University, Utrecht, The Netherlands, February 18, 2004. Host: Gerard Sleijpen.

3. *Two-Level Parallelism in a Stream-Function Model for Global Ocean Circulation.*
   North Carolina A&T University, High Point, North Carolina, U.S.A., January 15, 2004. Host: Alexandra Kurepa.

2. *Large-Scale Scientific Computing at CERFACS.*
   DCSE seminar, Delft University of Technology, Delft, The Netherlands, November 22, 2002. Host: Kees Oosterlee.

1. *Large-Scale Scientific Computing at CERFACS.*
   Department of Mathematics Colloquiums, Wake Forest University, Winston-Salem, North Carolina, U.S.A., October 23, 2002. Host: Marielba Rojas.

Minisymposium Lectures

7. *Description of a Low-Field MRI Scanner Based on Permanent Magnets.*
   Presented in a minisymposium on "Medical Imaging" at the 10th Colour and Visual Computing Symposium (`http://cvcs.no`), Gjovik, Norway, 16-17 September 2020.

6. *The Induced Dimension Reduction Method Applied to Convection-Diffusion-Reaction Problems.*
   Minisymposium "Numerical Techniques for Convection-Diffusion-Reaction Problems," at the European Conference on Numerical Mathematics and Advanced Applications ENUMATH 2015, Ankara, Turkey, September 14-19, 2015.

5. *An Efficient Method for Solving the Helmholtz Equation at Multiple Frequencies.*
   International Congress on Industrial and Applied Mathematics ICIAM 2011, Vancouver, Canada, July 18-22, 2011.

4. *An IDR Variant that Efficiently Exploits Bi-orthogonality Relations.*
   Minisymposium "Induced Dimension Reduction (IDR) Methods: a Family of Efficient Krylov Solvers," Monterey Bay-Seaside, California, U.S.A. October 26-29, 2009.

3. *IDR-based algorithms.*
   Minisymposium 1, 9th IMACS International Symposium on Iterative Methods in Scientific Computing, Lille, France, March 17-21, 2008.

2. *Convergence Bounds for Preconditioned GMRES Using Element-by-Element Estimates of the Field of Values.*
   Minisymposium "Preconditioned Krylov Methods for Finite Element Systems," European Conference on Computational Fluid Dynamics ECCOMAS CFD 2006, Egmond aan Zee, The Netherlands, September 5-8, 2006.

1. *Restarted GMRES with Inexact Matrix-Vector Products.*
   Minisymposium on Inner-Outer Iterations, *Conference on Numerical Analysis and Applications*, Rousse, Bulgaria, June 28-July 2, 2004.

Contributed Lectures

19. Approximating Eigenvectors with Fixed-Point Arithmetic: *A Step Towards Secure Spectral Clustering.*
    European Conference on Numerical Mathematics and Advanced Applications ENUMATH 2019, Egmond aan Zee, The Netherlands, September 30-October 4, 2019.

18. *Flexible and Multi-shift IDR Algorithms for Solving Large Sparse Linear Systems.*
SIAM Conference on Computational Science and Engineering, Boston, Massachussetts, U.S.A., February 25-March 1, 2013.

17. *Preconditioners for a Sequence of Shifted Linear Systems.*
SIAM Conference on Applied Linear Algebra, Valencia, Spain, June 18-22, 2012.

16. *Flexible and Multi-shift Induced Dimension Reduction Algorithms for Solving Large Sparse Linear Systems.*
Workshop "Numerical Linear Algebra - Algorithms, Applications, and Training", Delft, The Netherlands, April 10-13, 2011.

15. *A Parallel Deflated Preconditioned Conjugate Gradient Method for the Finite Element Analysis of Composite Materials.*
IV European Congress on Computational Mechanics ECCM 2010, Paris, France, May 16-21, 2010.

14. *Fast Iterative Methods for Climate Problems.*
DCSE seminar, Delft University of Technology, Delft, The Netherlands, November 6, 2009.

13. *Spectral Analysis of the Helmholtz Operator Preconditioned with a Shifted Laplacian.*
SIAM Conference on Applied Linear Algebra, Monterey Bay-Seaside, California, U.S.A., October 26-29, 2009.

12. *The IDR(s) Method for Solving Nonsymmetric Systems. Application to Optimization Problems.* 9th SIAM Conference on Optimization, Boston, Massachussetts, U.S.A., May 12-16, 2008.

11. *IDR(s), A Family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
DCSE seminar on the occasion Prof. Gene Golub's visit, Delft University of Technology, Delft, The Netherlands, July 5, 2007.

10. *Spectral Analysis of the Discrete Helmholtz Operator Preconditioned with a Shifted Laplacian.*
6th International Congress on Industrial and Applied Mathematics ICIAM07, Zürich, Switzerland, July 16-20, 2007.

9. *IDR(s), A Family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
Computational Methods with Applications Harrachov 2007, Harrachov, Czech Republic, August 19-25, 2007.

8. *IDR(s) A Family of Simple and Fast Algorithms for Solving Large Nonsymmetric Systems of Linear Equations.*
Sparse Days at Cerfacs, Toulouse, France, October 11-12, 2007.

7. *IDR(s) A Family of Simple and Fast Algorithms for Solving Nonsymmetric Systems of Linear Equations.*
Nederlands Mathematisch Congres 2007, Leiden, The Netherlands, April 12-13, 2007.

6. *Performance Modelling of a Mixed OpenMP/MPI Parallel Code for Oceanographic Calculations.*
   Twelfth International Congress on Computational and Applied Mathematics ICCAM 2006, Leuven, Belgium, July 10-14, 2006.

5. *Bounds on the Eigenvalue Range and on the Field of Values of Non-Hermitian and Indefinite Finite Element Matrices.*
   Eleventh International Congress on Computational and Applied Mathematics ICCAM 2004, Leuven, Belgium, July 26-30, 2004.

4. *Two Level Parallelism in a Stream-Function Model for Global Ocean Circulation.*
   9th European Conference on Parallel Processing Euro-Par 2003, Klagenfurt, Austria, August 26-29, 2003.

3. *Relaxation Strategies for Nested Krylov Methods.*
   Quatrième Seminaire sur l'Algorithmique Numérique Appliquée aux Problèmes Industriels, Calais, France, May 15-16, 2003.

2. *Large Scale Acoustic Simulations on Clusters of Multiprocessors.*
   International Conference on Integral Methods in Science and Engineering IMSE2002, Saint Étienne, France, August 7-10, 2002.

1. *Solving Large Linear Systems on Parallel Computers: The CERFACS Experience.*
   Congres National d'Analyse Numérique CANUM2002, Anglet, France, May 27-31, 2002.

Contributed Posters

2. *Anisotropic Diffusion Filtering Applied to Volumetric Low-Field MRI Images.*
   CIRM Conference on Parallel Solution Methods for Systems Arising from PDEs, Luminy, France, September 16-20, 2019. **Invited poster**. **Attendance fully funded by the organizers**.

1. *Numerical Modelling of a Pulse Combustion Burner: Limiting Conditions of Stable Operation.*
   ECMI 2008, London, United Kingdom, July 2008.

SERVICE

- Associate Editor, SIAM Undergraduate Research Online
  (https://www.siam.org/publications/siuro), February 2020-present.

- Referee for SISC, SIMAX, BIT, APNUM, Parallel Computing, Journal of Scientific Computing, Journal of Sound and Vibration and Journal of Computational and Applied Mathematics. I also refereed a number of conference papers, for conferences like VecPar, EuroPar, HPCN, and CDC.

- Member of the steering committee of the Strategic Research Orientation *Big Data* of the 4TU.AMI, 2013-2016.

- Event organization:

  - Co-organiser of the *Woudschoten 2020* conference, postponed until 2021.
  - Organiser of the symposium "MRI for Low-Resource Settings," Delft, September 27, 2018.
  - Member of the organising committee of the 3TU AMI symposium "Mathematics and Big Data," Delft, April 8, 2016.
  - Member of the organising committee of the *Preconditioning 2015* conference, Eindhoven, The Netherlands, June 17-19, 2015.
  - Co-organiser (with K. Abe, S. Fujino, M. Rojas, and G. Sleijpen) of the JSPS-NWO workshop *Numerical Linear Algebra - Algorithms, Applications, and Training*, Delft, The Netherlands, April 10-14, 2012.
  - Co-organiser (with Andy Wathen) of the minisymposium "New Developments in Iterative Solvers for Large Sparse Problems", ICIAM 2011, Vancouver, Canada, July 18-22, 2011.
  - Host of Dan Boley from October 2010 through April 2011. Co-organiser of a DCSE symposium on the occasion of his visit, October 14, 2010.
  - Co-host (with Marielba Rojas) of Danny Sorensen (from August through November 2010). Co-organiser of a DCSE symposium on "Model Order Reduction" on the occasion of his visit, September 23, 2010.
  - Co-organiser of the opening symposium of the 3TU Applied Mathematics Institute, April 15, 2010.
  - Co-organiser (with S. Fujino) of the minisymposium "Induced Dimension Reduction (IDR) Methods: a Family of Efficient Krylov Solvers," during the *SIAM Conference on Numerical Linear Algebra*, Monterey Bay-Seaside, California, U.S.A., October 26-29, 2009.
  - Local organiser topic *Parallel Numerical Algorithms* during the *EUROPAR 2009* conference, Delft, The Netherlands, August 25-28, 2009.
  - Host of Martin Gutknecht and Man-Chung Yeung and organiser of a DCSE symposium on IDR Methods, June 3, 2009.
  - Co-organiser of the *Gene Golub Around The World, Delft* symposium in honour of Prof. Gene Golub's memory on February 29, 2008.

– Organiser of a minisymposium on IDR(s) Methods during the *IMACS'08* conference. Other participants: Peter Sonneveld (TU Delft), Gerard Sleijpen (Utrecht University), and Seiji Fujino (Kyushu University). Lille, France, March 17-20, 2008.

– Member of the Organising Committee of Prof. Piet Wesseling's farewell symposium, Delft, The Netherlands, June 6, 2007.

– Host of Prof. Gene Golub and organiser of a special DCSE symposium on the occasion of his visit in May 2007. Approximately 80 persons attended.

– Co-organiser (with Daniel Loghin) of the minisymposium "Preconditioned Krylov Methods for Finite Element Systems" during the *ECCOMAS CFD 2006* conference. Other participants: Alison Ramage (University of Strathclyde), Mario Arioli (RAL), and Emmanuil Georgoulis (Leicester University). Egmond aan Zee, The Netherlands, September 5-8, 2006.

– Member of the Organising Committee *Nederlands Mathematisch Congres 42*, Delft, The Netherlands, March 27-28, 2006.

– Co-organiser (with Prof. Iain Duff) of the *Sparse Days at CERFACS* meeting, (with approximately fifty participants). Toulouse, France, June 2-3, 2004.

– Organiser of the minisymposium "Inner-Outer Iterations" at the *3rd Conference on Numerical Analysis and Applications*. Other participants: Jasper van den Eshof (Universität Düsseldorf), Jan Brandts (University of Amsterdam), and Daniel Loghin (Birmingham University). Rousse, Bulgaria, 2004.

– Organiser of the CERFACS Wide Interest Seminars, 2003-2004.

TEACHING

Service education

- Differential Equations for Aerospace Engineering (B.Sc., 4 ECTS, course responsible), 2005-2006 through 2012-2013.

- Advanced Numerical Methods for Applied Earth Sciences (M.Sc., 4 ECTS, course responsible), 2005-2006 through 2015-2016.

- Linear Algebra for Computer Science, module 1 (B.Sc., 4 ECTS), 2004-2005.

- Linear Algebra for Computer Science, module 2 (B.Sc., 4 ECTS), 2004-2005.

- Linear Algebra for Mechanical Engineering, module 1 (B.Sc., 4 ECTS), 2007-2008.

- Linear Algebra for Aerospace Engineering, module 1 (B.Sc., 4 ECTS), 2007-2008.

- Linear Algebra and Differential Equations for TPM (B.Sc., 3 EC) 2012-2013.

- Calculus module 2 for Life Science and Technology (B.Sc., 4 ECTS), 2004-2005.

- Calculus for Industrial Design, module 1 (B.Sc., 4 ECTS), 2005-2006, 2006-2007.

- Calculus for Industrial Design, module 3 (B.Sc., 4 ECTS), 2005-2006, 2006-2007.

- Product and movement for Industrial Design, (B.Sc., 2 ECTS), 2007-2008.

- Calculus for Mechanical Engineering, module 1 (B.Sc., 3 ECTS) 2008-2009 through 2010-2011.

Bachelor and Master Courses for Applied Mathematics

- Linear Algebra II (B.Sc., 6 ECTS), 2018-2019 through 2020-2021.

- Numerical Methods I for Applied Mathematics (B.Sc., 6 ECTS, course responsible), 2005-2006 through 2016-2017.

- Numerical Methods II for Applied Mathematics (B.Sc., 6 ECTS, course responsible) 2017-2018 through 2019-2020.

- Mathematical Data Science (M.Sc., 6 EC) 2014-2015 through 2019-2020.

- CSE Special Topics (M.Sc., 6 EC, course responsible) 2015-2016 through 2019-2020.

Minor

- LDE-Minor Frugal Innovation for Sustainable Development: Organisation and supervision of student projects in Uganda (B.Sc., 15 EC) 2018-2019 and 2019-2020.

Mastermath Courses

- Numerical Linear Algebra, National Master Course (M.Sc., 8 ECTS, course responsible together with Gerard Sleijpen from Utrecht University) 2007-2008 through 2010-2011.

Ph.D. Courses

- Ph.D. course on Iterative Methods, DTU, Denmark (by invitation) (Ph.D., 5 ECTS, course responsible), 2006-2007 and 2007-2008.

Student Supervision

Ph.D. Students

Current

11. Jun Li, visiting Ph.D. student, 2021-2022. **Supervisor**.

Past

10. Merel de Leeuw den Bouter, 2 May 2022. **Promotor**.
    Image Reconstruction for Low-Field MRI.
    Funded by *Delft Global Initiative.*

9. Aad Vijn, 9 December 2021. **Second Promotor**.
   Development of a Closed-Loop Degaussing System.
   Funded by *TNO Physics & Electronics Laboratory.*

8. Emmanuel Ahishakiye, 18 August 2021, Mbarara University of Science and Technology, Uganda. **Supervisor**.
   A Dictionary-Learning Approach for Image Reconstruction in Low-Field MRI.
   Funded by *NWO-WOTRO.*

7. Xiujie Shan, visiting Ph.D. student, 2018-2020. **Supervisor**.
   (Xiujie wil defend at Harbin University, China).
   PDE-Based Methods for Low-Field MRI.
   Funded by the *Chinese Scholarship Council (CSC).*

6. Reinaldo Astudillo, 16 March 2018. **Co-Promotor**.
   Induced Dimension Reduction Algorithms for Solving Non-Symmetric Sparse Matrix Problems.
   Funded by *Universidad Central de Venezuela* and *DIAM.*

5. Manuel Baumann, 10 January 2018. **Co-Promotor**.
   Fast Iterative Solution of the Time-Harmonic Elastic Wave Equation at Multiple Frequencies.
   Funded by *Shell.*

4. Yue Qiu, 7 December 2015. **Co-Promotor**.
   Preconditioning Optimal Flow Control Problems Using Multilevel Sequentially Semiseparable Matrix Computations .
   Funded by the *Chinese Scholarship Council (CSC).*

3. Rohit Gupta, 9 November 2015. **Co-Promotor**.
   GPU acceleration of Preconditioned Solvers for Ill-Conditioned Linear Systems.
   Funded by the Delft Institute of Applied Mathematics (*DIAM*).

2. Tom Jönsthövel, 1 February 2012. **Co-Promotor**.
   The Deflated Preconditioned Conjugate Gradient Method Applied to Composite Materials.
   Funded by the *European Commission*.

1. Tijmen Collignon, 1 April 2011. **Co-Promotor**.
   Efficient Iterative Solution of Large Linear Systems on Heterogeneous Computing Systems.
   Funded by *DCSE*.

M.Sc. Students

Note: The "Computer Simulations for Science and Engineering" (COSSE) Master's program is a joint study offered by several European universities. It was initially part of the Erasmus Mundus European Program.
SEC is the "Science Education and Communication" program.

Current

41. Eva Slingerland.
    Prediction of Tumor Response to Chemotherapy.

40. Erik ten Hagen.
    MOR for Topology Optimization.

Past

39. Aleid Bekkering, BME, 17 May 2022.
    Image Reconstruction for a Handheld Low-Field MRI Scanner via Deep Learning.
    In collaboration with *Leiden University Medical Center (LUMC)*.

38. Nathalie Oudhof, 13 April 2022.
    Predicting Tumour Response: Using Magnetic Resonance Imaging to Predict Tumour Response of HER2+ Breast Cancer Patients.
    In collaboration with *Erasmus MC*.

37. Elsemiek Smilde, 28 January 2022.
    ILC detection: Applying Image Processing and Deep Learning to Improve the Detection of Invasive Lobular Carcinoma Using Mammography.
    In collaboration with *Erasmus MC*.

36. Marcella Zijta, double major BME/AM, 12 December 2021.
    Automatic Segmentation of Low-Field MRI Brain Scans by Integrating Analytic and Deep Learning Techniques.
    In collaboration with *Leiden University Medical Center (LUMC)*.

35. David Heesterbeek, double major AM/AP, 27 September 2021.
    Sequence Optimisation for Magnetic Resonance Fingerprinting.
    In collaboration with *Department of Applied Physics*, Delft University of Technology.

34. Yperion Bristogiannis, 25 February 2021.
    Improving water surface current estimation from radar data.
    In collaboration with the company *Next Ocean*.

33. Koen Steinebach, 6 November 2020.
    Improving Probabilistic Treatment Planning with Polynomial Chaos Expansion for Proton Therapy.
    In collaboration with *Department of Applied Physics*, Delft University of Technology.

32. Giulia Ippolito, 19 October 2020. *Cum Laude.*
    Super Resolution Techniques Applied to Low-Field MRI.
    In collaboration with *Leiden University Medical Center (LUMC)*.

31. Irene Vooijs, COSSE, 27 July 2020.
    Combined Shape and Size Optimization of an Offshore Crane.
    In collaboration with the company *Tetrahedron*.

30. Dilan Geçmen, 13 February 2020.
    Deep Learning Techniques for Low-Field MRI.
    In collaboration with *LUMC*.

29. Mike Zoutendijk, 19 November 2019.
    Applying Deflation Methods in a Topology Optimization Procedure.
    In collaboration with *Department of Mechanical Engineering*, Delft University of Technology.

28. Taco Coppoolse, August 27, 2019.
    Elastic Registration of Histological Serial Sections: A Finite Element Approach.
    In collaboration with *University of Lubeck*.

27. Bibianne van der Maesen, 16 November 2018.
    A Computational Model of Nanoparticle Growth: from Spark to Ablation.
    In collaboration with the company *vsparticle*.

26. Wouter Swart, 30 August 2018.
    Methods for Improving the Computational Performance of Sequentially Linear Analysis.
    In collaboration with the company *DIANA FEA*.

25. Leonard Huijzer, 28 Augustus 2018.
    Redesign of the Solution Algorithms in Wanda.
    In collaboration with *Deltares*.

24. Patricia van Marlen, COSSE, 12 April 2018.
    Linear and Anisotropic Diffusion in Image Processing: A Study on Implementation, Parameters and Segmentation.
    In collaboration with *LUMC*.

23. Lisa Steverink, 31 Augustus 2017. *Cum Laude.*
    Secure Spectral Clustering: The Approximation of Eigenvectors in the Integer Domain.
    In collaboration with *TNO Cybersecurity and Robustness*.

22. Eef van Dongen, 3 July 2017. *Cum Laude.*
    Coupling Approximation Levels for Modeling Ice Flow on Paleo Time Scales.
    In collaboration with *Stockholm University.*

21. Merel de Leeuw den Bouter, 14 June 2017. *Cum Laude.*
    Image Reconstruction in Low-Field MRI: A Super-Resolution Approach.
    In collaboration with *LUMC.*

20. Ankit Mittal, COSSE, 12 Augustus 2016. *Cum Laude.*
    Parallelization of an Experimental Multiphase Flow Algorithm.
    In collaboration with *TNO TPD.*

19. Melissa Wijchers, 31 Augustus 2016.
    Image Reconstruction in MRI: The Possibility of Portable, Low-Cost MRI Scanners.
    In collaboration with *LUMC.*

18. Kirsten Koolstra, 24 September 2015.
    Modeling Electromagnetic Fields in Strongly Inhomogeneous Media: An Application in MRI.
    In collaboration with *LUMC.*

17. Shobhit Jain, double major AM/ME, 24 September 24, 2015. *Cum Laude.*
    Model Order Reduction for Non-Linear Structural Dynamics.
    In collaboration with *Department of Mechanical Engineering*, Delft University of Technology.

16. Y.M. Eliza Ang, COSSE, 10 July 2015. *Cum Laude.*
    Efficiency Improvement of Panel Codes.
    In collaboration with *MARIN.*

15. Marijn Schreuders, SEC, 8 July 2014.
    PIDR(s): IDR(s) as a Projection Method.

14. Alex Sangers, 27 June 2014. *Cum Laude.*
    Enhancing Iterative Solution Methods for General FEM Computations Using Rigid Body Modes.
    In collaboration with the company *DIANA FEA.*

13. Manuel Baumann, COSSE, 8 July 2013. *Cum Laude.*
    Nonlinear Model Order Reduction Using POD/DEIM for Optimal Control of Burgers' Equation.

12. Gemma van der Sande, 23 May 2012. *Cum Laude.*
    Acceleration of the 2D Helmholtz Model HARES.
    In collaboration with the company *SVASEK Hydrolics.*

11. Jan de Gier, 29 August 2012.
    Iterative Solutions to Sequences of Helmholtz Equations.

10. Karl Kästner, COSSE, 29 August 2012.
    Computing the Spectrum of the Confined Hydrogen Atom.
    In collaboration with *European Space Agency ESA-ESTEC.*

9. Frank Tabak, 2 November 2012.
   Robust Algorithms for Discrete Tomography.
   In collaboration with *CWI*.

8. Joost van Zwieten, 31 May 2011.
   Efficient Solution Methods for the Incompressible Stokes Problem.
   In collaboration with the company *CULGI*.

7. Konrad Kaliszka, 18 September 2010.
   Developing a Parallel Solver for Mechanical Problems.
   In collaboration with the company *Plaxis*.

6. Elwin van't Wout, 20 August 2009. *Cum Laude.*
   Improving the Linear Solver Used in the Interactive Wave Model of a Real-Time Ship Simulator.
   In collaboration with *MARIN*.

5. Kees van 't Slot, May 2008.
   Robust Linear Solvers for the Adjoint Equations for Optimal Waterflood Design.
   In collaboration with *Shell*.

4. Pieter van Heerbeek, August 2008.
   Mathematical Modelling of a Pulse Combustor of the Helmholtz-type.
   In collaboration with the company *DLF Sustainable*.

3. Jan-Willem van Leeuwen, 5 June 2007.
   Computation of Thermo-Acoustic Modes in Combustors.
   In collaboration with *CERFACS*.

2. Femke Kessels, 22 January 2007.
   Numerical Methods for the Stationary Shallow Water Equations. In collaboration with the company *VORtech*.

1. Gertjan van Zwieten, 15 August 2006.
   Increased Parallel Efficiency for Space-Time Multiscale Computations of Turbulent Flows.
   In collaboration with the company *Habanera*.

B.Sc. Students

Current

2. Kate McDonald, double major AP/AM.
   Image Reconstruction in Optical Diffraction Tomography.

1. Simone Birkenhäger, double major AP/AM.
   Cardiac Perfusion Imaging Using Blood-Flow Saturation in Simultaneous Multi-Slice Cine MRI.

Past

30. Yara Lottering, 8 July 2022.
Can You Paralleliza Time?: Moving Through the Complexity of Time.

29. Doris Aafjes, 15 July 2021.
Image Processing on the EDGE-TPU.

28. Pieter Oppelaar, 2 July 2021.
Model Based Image Reconstruction for Low-Field Hand-Held MRI: On imaging using field geometry and sample translations.

27. Age Francke, 24 August 2020.
Data-Driven Image Reconstruction for Low-Field MRI.

26. Claire Wagenaar, 27 July 2020.
An Evaluation of Image Segmentation Techniques for MRI Scans.

25. Lyanne de Haas, 29 August 2019.
Noise Reduction in MRI Images Using Partial Differential Equations.

24. Manon Waling, 29 August 2019.
Verbeterde Beeldreconstructie bij CT-Scanners.

23. Manon van Zon, 28 August 2019.
Total Least Squares Method for the Purpose of Noise Reduction in Low-Cost MRI Images.

22. Lars kleyn Winkel, 28 August 2019.
Coupled Reduced Order Model and Adjoint Methodologies for Proton Therapy.

21. Angeline Meijer, 27 August 2019.
Optimizing the Gradient Ring of a Low-Field MRI Scanner.

20. Piotr Benedysiuk, 02 April 2019.
Conductance of a Nanowire with Nonlinear Electrostatics.

19. Yanna van der Vlugt, 03 July 2018. *Cum Laude.*
Large-Scale SVD Algorithms for Latent Semantic Indexing, Recommender Systems and Image Processing.

18. Pieter Verstraten, 30 August 2017.
Modeling the Behaviour of Adsorbed Chlorine Atoms on a Copper Surface.

17. Jenny Tjan, 28 June 2016.
How to Optimize the Personalization Vector to Combat Link Spamming.

16. Tom Schoehuijs, 01 June 2016.
Modelling the Induced Oscillations of Elements on a Silicon Transducer.

15. Thijs Schouten, 09 July 2015. *Cum Laude.*
Stability Analysis of the Equations of Motion for the 2014 Delft Solar Boat.

14. Cindy Caljouw, 03 July 2015.
    Regularisatie Methodes voor Seismische Tomografie (Regularization Methods for Seismic Tomography).

13. Jorik Oostenbrink, 03 July 2015.
    Implementing the Reordered PageRank Algorithm in Giraph.

12. Inoni van Dorp, 03 July 2015. *Cum Laude.*
    Computer Tomography: Image Reconstruction in the Presence of Noise.

11. Rory Gravendeel, 23 February 2015.
    Accelerating Google PageRank by Applying Aitken Extrapolation and Quadratic Extrapolation.

10. Cindy Boon, 25 August 2014.
    Het Rangschikken van Genen (Gene Ranking).

9. Tamara Kloek, 18 September 2012. *Cum Laude.*
   Conjugate Gradients and Conjugate Residuals Type Methods for Solving Least Squares Problems from Tomography.

8. Alex Sangers, 12 July 2012.
   The second eigenvector of the Google matrix and its relation to link spamming.

7. Tom Baksteen, 02 March 2012.
   Google's PageRank: De Tweede Eigenwaarde en een Variable Sprongkans.

6. Melissa De Koning, 27 May 2011.
   CT-Scan Met Zo Min Mogelijk Projecties.

5. Rien Den Besten, 24 August 2010.
   The PageRank Problem.

4. Suzanne De Jong, 04 July 2010. *Cum Laude.*
   Bepalen van Luchtvervuiling bij Wegen.

3. Thea Vuik, 02 July 2010. *Cum Laude.*
   Reconstructie van de Aardkorst met Tomografie (Reconstruction of the Earth's Crust by Tomography).

2. Elwin van't Wout, July 2007. *Cum Laude.*
   Modelleren van oceaanstroming.

1. David Bijl, 2005.