Daniela Calvetti

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MatSciNet: cited 1204 times by 939 authors
Google citations: 4696
h-index: 34
i10-index: 98

Education

1980	Laurea, Mathematics	University of Bologna
1985	MS, Mathematics	University of North Carolina at Chapel Hill
1989	PhD, Mathematics	University of North Carolina at Chapel Hill

Areas of Expertise

- Numerical analysis and scientific computing
- Computational and statistical inverse problems
- Orthogonal polynomials, matrices and quadratures
- Predictive mathematical modeling
- Medical application, in particular brain metabolism and imaging

Professional Experience

2001–present	Professor	Math, Applied Math, and Statistics	Case Western Reserve University
2013–2014	Chair	Math, Applied Math, and Statistics	Case Western Reserve University
2008-2013	Chair	Mathematics	Case Western Reserve University
1997-2001	Associate Professor	Mathematics	Case Western Reserve University
1996–1997	Associate Professor	Mathematics	Stevens Institute of Technology
1990–1996	Assistant Professor	Mathematics	Stevens Institute of Technology
1989–1990	Assistant Professor	Mathematics	University of Colorado–Pueblo
1988–1989	Assistant Professor	Mathematics	North Carolina State University

Recognitions and Honors

Plenary speaker at SIAM Uncertainty Quantification Conference 2016
Simons Foundation Fellow 2014-15.
The James Wood Williamson Chair, 2013-present.
The Mather Spotlight Prize for Women's Scholarship, 2013.
The John S. Diekhoff Award In Recognition of Excellence in Graduate Mentoring, 2013.
Finnish Distinguished Professorship from the Academy of Finland 2008–2013 (declined) .
International Advisory Board of Inverse Problems 2004– present.
NSF Mid-Career grant 1995.

Recent Funding

NSF-DMS 1522334 *Priorconditioned Krylov subspace methods for inverse problems.* 8/1/2015 - 7/31/ 2019
NIH -U01 GM111251 *Multi-scale modeling of gas transport through gas channels in living cells* 1/1 2015 - 12/31/2019
Simons Fellowship in Mathematics *The inverse problem of magnetoencephalography* 8/1/2014 - 5/31/2015
Simons Collaborative Grant *Advances in predictive mathematical models of brain metabolism* 9/1/2012 - 8/31/2016
NSF UBM 0634612: UBM: *Undergraduate Research at the interface of Mathematics and Biology* 1/1/2007 - 12/31/2012

Selected professional activity

SIAM Committee of George Pólya Prize for Mathematical Exposition 2018-present
SIAM Outstanding Papers Committee 2017-present
Associate editor of Inverse Problems, 2016 – present
Associate editor of the SIAM Computational Science and Engineering book series, 2016 – present.
Associate editor of Journal of Mathematical Imaging and Vision, 2014 – present.
Board member of the Institutional Advisory Board of the Case Comprehensive Cancer Center, 2013- -2015.
Guest editor of the special issue of Inverse Problems *Inverse Problems in the Bayesian Framework.*
Associate editor of Frontiers in Neuroenergetics, 2012 – present.
Associate editor of Mathematics of Computations, 2008 – 2016.
Member of the International Advisory Board of Inverse Problems 2004 – 2016.
Associate editor of Inverse Problems and Imaging, 2005 – 2009.
Associate editor of Electronic Transactions on Numerical Analysis, 1997 – 2009.
Associate editor of the SIAM Journal on Matrix Analysis and Applications Analysis, 1995 – 2007.

Supervision of doctoral theses

1. Monica Pragliola (exp 2019). University of Bologna, Italy

2. Gabriela Capo Rangel (exp 2019) Computational predictive modeling of integrated cerebral metabolism, electrophysiology and hemodynamics. Universidad del Pais Vasco, Spain.

3. Jamie Prezioso (2017) An inverse problem of cerebral hemodynamics in the Bayesian framework. Case Western Reserve University.

4. Margaret Callahan (2016): Parameter estimation and inference across scales. Case Western Reserve University.

5. Lijun Yu (2016): Sequential Monte Carlo for estimating brain activity from MEG data. Case Western Reserve University.

6. Charles Joseph (2014): Multiscale model and analysis of option markets. Case Western Reserve University.

7. Edrissa Gassama (2014): Piezoelectric inverse problems with resonance data: a sequential Monte Carlo analysis. Case Western Reserve University.

8. Andrea Arnold (2014): Sequential Monte Carlo parameter estimation for differential equations. Case Western Reserve University.

9. Yougan Cheng (2014): Computational models of brain energy metabolism at different scales. Case Western Reserve University.

10. Joseph Volzer (2014): An invariant embedding approach to domain decomposition. Case Western Reserve University.

11. Debra McGivney (2013) : Statistical preconditioners and quantitative imaging in electrical impedance tomography. Case Western Reserve University.

12. Laura Homa (2013) : Bayesian methods for source separation in magnetoencephalography. Case Western Reserve University.

13. Taina Immonen (2013) : Computational models of ex vivo HIV-1 dynamics and fitness across scales. Case Western Reserve University.

14. Rossana Occhipinti (2009) : In silico testing of hypotheses for brain energy metabolism with new computational models within a statistical framework. Case Western Reserve University.

15. Amy Kuceyeski (2009) : Efficient computational and statistical models of hepatic metabolism. Case Western Reserve University.

16. Rachael Hageman (2007) : Large scale Bayesian parameter estimation and sensitivity analysis for cardiac metabolism during ischemia. Case Western Reserve University.

17. Sun-Mi Kim (2004):Orthogonal polynomials, quadrature rules, and linear algebra. Kent State University.

18. Abdallah Shuibi (2003) : Numerical methods for large scale ill-posed problems. Kent State University.

19. Bryan Lewis (2000) : Krylov subspace methods for signals, systems and control. Kent State University.

SUPERVISION OF MASTERS

- Sang Du (2012): Data mining applications to brain energy metabolism. Case Western Reserve University.

- James Munch (2011): Blind image deconvolution with conditionally Gaussian hypermodels. Case Western Reserve University.

- Huaizhi Chen (2009): Estimating stochastic volatility using particle filters. Case Western Reserve University.

- Regina Reilly (1993): Gaussian elimination with complete and partial pivoting: a hybrid scheme. Stevens Institute of Technology.

PUBLICATIONS

Monographs

1. D. Calvetti and E. Somersalo (2012) *Computational Mathematical Modeling. An Integrated Approach through Scales.* SIAM, Philadelphia.

2. D. Calvetti and E. Somersalo (2007) *Introduction to Bayesian Scientific Computing – Ten Lectures on Subjective Computing.* Springer Verlag, New York

Publications in refereed journals or books

1. D. Calvetti E. Somersalo and A. Strang (2019) Hierachical Bayesian models and sparsity: ℓ_2-magic. Inverse problems **35** 035003.

2. D. Calvetti and E. Somersalo (2019) Brain energy metabolism. In: Jaeger D., Jung R. (eds) Encyclopedia of Computational Neuroscience. Springer, New York, NY.

3. D. Calvetti, A. Pascarella, F. Pitolli, E. Somersalo and B. Vantaggi (2018) Brain Activity Mapping from MEG Data via a Hierarchical Bayesian Algorithm with Automatic Depth Weighting. Brain Top. Aug 18, pp.1-31.

4. D. Calvetti, J Prezioso and E Somersalo (2018) Estimating hemodynamic stimulus and blood vessel compliance from cerebral blood flow data. J Theor Biol Oct 10, Online version: DOI: 10.1016/j.jtbi.2018.10.011

5. D. Calvetti, F. Pitolli, E. Somersalo and B. Vantaggi (2018) Bayes meets Krylov: Statistically inspired preconditioners for CGLS. SIAM Review, 60(2), pp.429-461.

6. D. Calvetti and E. Somersalo (2018) Inverse problems: from regularization to Bayesian inference. WIREs Computational Statistics e1427 (19pp.)

7. D. Calvetti, M. Dunlop, E. Somersalo and A. Stuart (2018) Iterative updating of model error in Bayesian inversion. Inverse Problems 34 (2): 025008

8. Calvetti D, Capo Rangel G, Gerardo Giorda L and Somersalo E (2018) A computational model integrating brain electrophysiology and metabolism highlights the key role of extracellular potassium and oxygen. J Theor Biol 446, 238-258.

9. D. Calvetti, F. Pitolli, J. Prezioso, E. Somersalo and B. Vantaggi (2017) Priorconditioned CGLS-based quasi-MAP estimate, statistical stopping rule, and ranking of priors. SIAM J Sci Computing **39**: S477-S500

10. M. Callahan, D. Calvetti and E. Somersalo (2017) Beyond modeling limit: Bayesian inference across scales. SIAM/ASA J Uncertainty Quantification **5** : 665-693.

11. D. Calvetti, Y. Cheng and E. Somersalo (2016) Uncertainty quantification in flux balance analysis of spatially lumped and distributed models for a neuron-astrocyte complex. J Math Biol 73 1823-1849.

12. D. Calvetti, A. Pascarella, F. Pitolli, E. Somersalo and B. Vantaggi (2015) A hierarchical Krylov-Bayes iterative inverse solver for MEG with physiological preconditioning. Inverse Problems **31** 125005. This article was selected by the journal to be accompanied by an Insights presentation.

13. D. Calvetti, Y. Cheng and E. Somersalo (2015): A spatially distributed computational model of brain cellular metabolism. J Theor Biol **376** 48-65.

14. D. Calvetti, PJ. Hadwin, JMJ Huttunen, D. Isaacson, JP. Kaipio, D. McGivney, E. Somersalo and J. Volzer (2015): : Artificial boundary condition and domain truncation in electrical impedance tomography. Part II: Computed examples. Inverse Prob Imaging **9** 767-789.

15. D. Calvetti, PJ. Hadwin, JMJ Huttunen, D. Isaacson, JP. Kaipio and E. Somersalo (2015): Artificial boundary condition and domain truncation in electrical impedance tomography. Part I: Theory and preliminary examples. Inverse Prob Imaging **9** 749-766.

16. D. Calvetti, L. Reichel and H. Xu (2015): A CS decomposition for orthogonal matrices with application to eigenvalue computation. Linear Algebra Appl., **476**: 197-232.

17. D. Calvetti and E. Somersalo (2015): Life sciences though mathematical models. Rend. Fis. Acc. Lincei **26** (Suppl. 2) S192-S201. DOI 10.1007/s12210-015-0422-5.

18. S. Martelli, D. Calvetti, E. Somersalo and M. Viceconti (2015): Stochastic modelling of muscle recruitment during activity. Interface Focus **5** 20140094; DOI: 10.1098/rsfs.2014.0094.

19. D. Calvetti, J. Kaipio and E. Somersalo (2014): Inverse problems in the Bayesian framework. Inverse Problems 30(11), 110301. This is an introductory article for a topical special issue on Bayesian statistical methods in inverse problems, written by the guest editors. It has been for several months among the most downloaded articles of the journal.

20. A. Arnold, D. Calvetti and E. Somersalo (2014) Parameter estimation for stiff deterministic systems via ensemble Kalman filter. Inverse Problems **30** : 105008. The article was included in the 2014 Selected Highlights of the Journal Inverse Problems.

21. D. Calvetti, O. Ernst and E. Somersalo (2014) Dynamic updating of numerical model discrepancy using sequential sampling. Inverse Problems **30**: 114019.

22. A. Arnold, D. Calvetti, A. Gjedde, P. Iversen and E. Somersalo (2014): Astrocytic tracer dynamics estimated from $1-^{11}$C-acetate PET measurements. Math. Med. Biol. doi:10.1093/imammb/dqu021.

23. T. Immonen, D. Calvetti and E. Somersalo (2014) Modeling HIV-1 dynamics and fitness in cell culture across scales. Bull. Math. Biol. **76**: 486-514.

24. D. Calvetti, E. Somersalo and R. Spies (2014): Variable order smoothness priors for ill-posed inverse problems, Math. Comp., S 0025-5718 02909-8.

25. A. Arnold, D. Calvetti and E. Somersalo (2013) Linear Multistep methods, particle filtering and sequential Monte Carlo. Inverse Problems **29**: 085007 The article was for several months among the most downloaded articles in all journals of the Institute of Physics.

26. S. Martelli, D. Calvetti, E. Somersalo, M. Viceconti and F. Taddei (2013) Computational tools for calculating alternative muscle force patterns during motion: A comparison of possible solutions. J Biomech **46**: 2097-2100.

27. D. Calvetti and E. Somersalo (2013) Quantitative in silico analysis of neurotransmitter pathways under steady state conditions. Frontiers in Endochrinol **4**: 137.

28. L. Homa, D. Calvetti, A. Hoover and E. Somersalo (2013): Bayesian preconditioned CGLS for source separation in MEG time series. SIAM J Sci. Comput. **35**: B778-B798.

29. E. Somersalo, R. Occhipinti, WF Boron and D. Calvetti D (2012) A reaction-diffusion model of CO_2 influx into an oocyte. J. Theor. Biol. **309**:185-203.

30. T. Immonen, R. Gibson, T. Leitner, MA Miller, EJ Arts, E. Somersalo and D. Calvetti (2012): A hybrid stochastic-deterministic computational model accurately describes spatial dynamics and virus diffusion in HIV-1 competition assay. J Theor. Biol. **312C**: 120-132.

31. D. McGivney, D. Calvetti and E. Somersalo (2012) Quantitative imaging with electrical impedance spectroscopy. Phys. Med. Biol. **57** 7289.

32. E. Somersalo, Y. Cheng and D. Calvetti (2012): The metabolism of neurons and astrocytes through mathematical models. Ann. Biomed. Eng. **40** 2328-2344.

33. D. Calvetti, D. McGivney and E. Somersalo (2012) Left and right preconditioning for electrical impedance tomography with structural information. Inverse Problems **28** 055015. The article was for months among the most downloaded articles in all journals of the Institute of Physics.

34. D. Calvetti and E. Somersalo (2012) Ménage à trois: the role of neurotransmitters in the energy metabolism of astrocytes, glutamatergic, and GABAergic neurons. J. Cereb. Blood Flow and Metab. **32** 1472-1483.

35. D. Calvetti and E. Somersalo (2011) Dynamic activation model for glutamatergic neurovascular unit. J Theor. Biol. **274** 12–29.

36. D. Calvetti, B. Wodlinger, D.M.Durand and E. Somersalo (2011) Hierarchical beamformer and cross-talk reduction in electroneurography. J Neural Eng. **8**: 056002.

37. D. Calvetti, L. Homa and E. Somersalo (2011) Bayesian mixture models for source separation in MEG. Inverse Problems **27**:115001.

38. R. Occhipinti, E. Somersalo and D. Calvetti (2010) Energetics of inhibition: insights with a computational model of the human GABAergic neuron-astrocyte cellular complex. J Cereb. Blood Flow Metab. **30**: 1834-1846.

39. J.M. Bardsley, D. Calvetti and E. Somersalo (2010) Hierarchical regularization for edge-preserving reconstruction of PET images. Inverse Problems **26**: 035010. doi: 10.1088/0266-5611/26/3/035010.

40. J. Heino, D. Calvetti and E. Somersalo (2010) METABOLICA: A statistical research tool for analyzing metabolic networks. Comput. Meth. Progr. Biomed. **97**: 151-167.

41. D. Calvetti, H. Hakula, S. Pursiainen and E. Somersalo (2009) Conditionally Gaussian hypermodels for cerebral source localization. SIAM J. Imaging Sci. **2** 879-909.

42. D. Calvetti, A. Kuceyeski and E. Somersalo (2008) Sampling-based analysis of a spatially distributed model for liver at steady state. Multiscale Model. Simulation **7** 407-431.

43. D. Calvetti, R. Hageman, R. Occhipinti and E. Somersalo (2008) Dynamic Bayesian sensitivity analysis of myocardiac metabolism. Math. Biosci. **212** 1-21.

44. D. Calvetti and E. Somersalo (2008) Hypermodels in the Bayesian imaging framework. Inverse Problems **24** 034013.

45. P. Hiltunen, D. Calvetti and E. Somersalo (2008) An adaptive smoothness regularization algorithm for optical tomography. Optics Express **16** 19957-19977.

46. R. Occhipinti, E. Somersalo and D. Calvetti (2008) Astrocytes as the glucose shunt for glutamatergic neurons at high activity: an in silico study. J. Neurophysiol. **101** 2516-2527. electronic version: Doi:10.1152/jn.90377.

47. D. Calvetti and E. Somersalo (2007) Microlocal sequential regularization in imaging. Inverse Problems and Imaging **1** (2007) 1-11.

48. R. K. Dash, E. Somersalo, M. E. Cabrera and D. Calvetti (2007) An efficient deconvolution algorithm for estimating oxygen consumption during muscle activities. Comput. Meth. Prog. Biomed. **85** 247-256.

49. D. Calvetti, J. Heino, E. Somersalo and K. Tunyan (2007) Bayesian stationary state flux balance analysis for a skeletal muscle metabolic model. Inverse Problems and Imaging 1 (2007), 247-263.

50. D. Calvetti and E. Somersalo (2007) Gaussian hypermodels and recovery of blocky objects. Inverse Problems **23** 733-754.

51. R. Occhipinti, M.A. Puchowitcz, J.C. LaManna, E. Somersalo and D. Calvetti (2007) Statistical analysis of metabolic pathways of brain metabolism at steady state. Ann. Biomed. Engineering **6** 886-902.

52. D. Bertaccini and D. Calvetti (2007) Fast simulation of solid tumors thermal ablation treatments witha 3D reaction diffusion model, J. Comp. Biol. Med **37** 1173-1182.

53. J. Heino, K. Tunyan, D. Calvetti and E. Somersalo (2007) Bayesian flux balance analysis applied to skeletal muscle metabolic model. J. Theor. Biol. **248** 91-110.

54. D. Calvetti (2007) Preconditioned iterative methods for ill-conditioned linear systems from a Bayesian inversion perspective, J. Comput. Appl. Math **198** 378-395.

55. D. Calvetti, J. P. Kaipio and E. Somersalo (2006) Aristotelian prior boundary conditions. Int. J. Math. Comp. Sci. **1** 63-81.

56. D. Calvetti, R. Dash, E. Somersalo and M. Cabrera (2006) Local regularization method applied to estimation of oxygen consumption during muscle activities. Inverse Problems **22** 229-243.

57. D. Calvetti, F. Sgallari and E. Somersalo (2006) Image inpainting and bootstrap priors. Image and Vision Computing **24** 782-793.

58. D. Calvetti, R. Hageman and E. Somersalo (2006) Large-scale Bayesian parameter estimation for a three-compartment cardiac metabolism model during ischemia. Inverse Problems **22** 1797-1816.

59. D. Calvetti and E. Somersalo (2006) Large scale statistical parameter estimation in complex systems with an application to metabolic models. Multiscale Modelling and Simulation 5 1333-1366.

60. D. Calvetti and E. Somersalo (2005) Priorconditioners for linear systems. Inverse Problems **21** 1397-1418.

61. D. Calvetti and E. Somersalo (2005) Statistical compensation of boundary clutter in image deblurring. Inverse Problems **21** 1697-1714.

62. D. Calvetti, S.-M. Kim and L. Reichel (2005) Quadrature rules based on the Arnoldi process, SIAM J.Matrix Anal. Appl. **26** 765-781.

63. A. Chvetsov, D. Calvetti, J Sohn and T. Kinsella (2005) Regularization of inverse planning for intensity modulated radiotherapy, J. of Medical Physics **32** 501-514.

64. D. Calvetti, L. Reichel and A. Shuibi (2005) Invertible smoothing preconditioners for linear discrete ill-posed problems, Appl. Numer. Math. **54** 135-149.

65. A .Nair, D. Calvetti and D.G. Vince (2004) Regularized Autoregressive Analysis of Intravascular Ultra-sound Backscatter: Improvement in Spatial Accuracy of Tissue Maps, IEEE Trans. Ultrason.Ferroelectr. Freq. Control (A) **51** 420-431.

66. D. Calvetti, G. Landi, L. Reichel and F. Sgallari (2004) Nonnegativity and iterative methods for ill-posed problems, Inverse Problems **20** 1747-1758.

67. D. Calvetti and L. Reichel (2004) Tikhonov regularization with a solution constraint, SIAM J. Sci. Comput. **26** 224-239.

68. J. Baglama, D. Calvetti and L. Reichel (2003) IRBL: An implicitly restarted block Lanczos method for large-scale Hermitian eigenproblems, SIAM J. Sci. Comput. **24** 1650-1677.

69. D. Calvetti, L. Reichel and A. Shuibi (2003) L-curve and curvature bounds for Tikhonov regularization, Numer. Algorithms **35** 301-314.

70. D. Calvetti and L. Reichel (2003) Pole placement preconditioning, Linear Algebra Appl. **366** 99-120.

71. D. Calvetti, L. Reichel and A. Shuibi: Enriched Krylov subspace methods for ill-posed problems, Linear Algebra Appl. **362** 257-273.

72. D. Calvetti and L. Reichel (2003) Tikhonov regularization of large scale problems, BIT **43** 263 -283.

73. D. Calvetti and L. Reichel (2003) On the evaluation of polynomial coefficients, Numer. Algorithms **33** 153-161.

74. D. Calvetti and L. Reichel (2003) Gauss quadrature applied to trust region computations, Numer. Algorithms **34** (2003) 85-102.

75. J. Baglama, D. Calvetti and L. Reichel (2003) IRBL: An implicitly restarted block Lanczos method for large scale Hermitian eigenproblems, SIAM J. Sci. Comput. **24** 1650-1677.

76. J. Baglama, D. Calvetti and L. Reichel (2003) Algorithm 827: irbleigs: A MATLAB program for computing a few eigenpairs of a large sparse Hermitian matrix, ACM Trans. Math. Software **29** 337-348.

77. D. Calvetti and L. Reichel (2003) Symmetric Gauss-Lobatto and modified anti-Gauss rules, BIT **43** 541–554.

78. C. Ramanathan, P. Jia, R. Ghanem, D. Calvetti and Y. Rudy (2003) Noninvasive Electrocardiographic Imaging (ECGI): Application of the Generalized Minimal Residual (GMRes) method, Ann.Biomed. Eng. **3** 981–994.

79. D. Calvetti and L. Reichel (2003) Gauss quadrature rules applied to trust region computations, Numer. Algorithms **34** 85-102.

80. D. Calvetti, B. Lewis and L. Reichel (2002) GMRES, L-curves and discrete ill-posed problems, BIT **42** 44-65.

81. D. Calvetti, B. Lewis and L. Reichel (2002) On the regularizing properties of the GMRES method, Numer. Math. **91** 605-625.

82. D. Calvetti, P.C. Hansen and L. Reichel (2002) L-curve curvature bounds via Lanczos bidiagonalization, Elec. Trans. Numer. Anal. **14** 20-35.

83. D. Calvetti and L. Reichel (2002) Lanczos-based exponential filtering for discrete ill-posed problems, Numer. Algorithms **29** 45–65.

84. D. Calvetti, S.-M. Kim and L. Reichel (2002) The restarted QR-algorithm for eigenvalue computation of structured matrices, J. Comput. Appl. Math. **149** 415–422.

85. D. Calvetti, B. Lewis and L. Reichel (2001) On the choice of subspace for iterative methods for linear discrete ill-posed problems, Int. J. Appl. Math. Comput. Sci. **11** 1069-1092.

86. G.S. Ammar, D. Calvetti, W.B. Gragg and L. Reichel (2001) Polynomial zerofinders based on Szego polynomials, J. Comput. Appl. Math. **127** 1-16.

87. D. Calvetti, L. Reichel, F. Sgallari and G. Spaletta (2000) A regularizing Lanczos iteration method for under-determined linear systems, J. Comput. Appl. Math. **115** 101-120.

88. D. Calvetti, S. Morigi, L. Reichel and F. Sgallari (2001) An iterative method with error estimators, J.Comput. Appl. Math. **127** 93-119.

89. D. Calvetti, B. Lewis and L. Reichel (2001) On the solution of large Sylvester-observer equations, Numer. Linear Algebra Appl. **8** 435-451.

90. D. Calvetti, S. Morigi, L. Reichel and F. Sgallari (2000) Tikhonov regularization and the L-curve for large, discrete ill-posed problems, J. Comput. Appl. Math. **123** 423-446.

91. D. Calvetti and L. Reichel (2000) Iterative methods for large continuation problems, J. Comput. Appl. Math. **123** 217-240.

92. D. Calvetti, S. Morigi, L. Reichel and F. Sgallari (2000) Computable error bounds and estimates for the conjugate gradient method, Numer. Algorithm **25** 79-88.

93. D. Calvetti, B. Lewis and L. Reichel (2000) GMRES-type methods for inconsistent systems, Linear Algebra Appl. **316** 157-169.

94. D. Calvetti, S. Morigi, L. Reichel and F. Sgallari (2000) An L-ribbon for large underdetermined linear discrete ill-posed problems, Numer. Algorithms **25** 89-107.

95. D. Calvetti, G.H. Golub, W.B. Gragg and L. Reichel (2000) Computation of Gauss-Kronrod quadrature rules, Math. Comp. **69** 1035-1052.

96. D. Calvetti and L. Reichel (1999) A block Lanczos method for large continuation problems, Numer. Algorithms **21** 109-118.

97. D. Calvetti, G.H. Golub and L. Reichel (1999) A computable error bound for matrix functionals, J. Comput. Appl. Math. **103** 301-306.

98. D. Calvetti, G.H. Golub and L. Reichel: Estimation of the L-curve via Lanczos bidiagonalization, BIT **39** (1999) 603-619.

99. D. Calvetti, B. Lewis and L. Reichel (1999) On the selection of poles in the single input pole placement problem, Linear Algebra Appl. **302-303** 331-345.

100. G.S. Ammar, D. Calvetti and L. Reichel (1999) Computation of Gauss-Kronrod quadrature rules with non-positive weights, Elec. Trans.Numer. Anal. **9** 26-38.

101. D. Calvetti and L. Reichel (1999) On an inverse eigenproblem for Jacobi matrices, Adv. Comput. Math. **11**11-20.

102. D. Calvetti, L. Reichel and Q. Zhang (1999) Iterative exponential filtering for large discrete ill-posed problems, Numer. Math. **83** 535-556.

103. J. Baglama, D. Calvetti, G.H. Golub and L. Reichel (1999) Adaptively preconditioned GMRES algorithms, SIAM J. Sci. Comput. **20** 243-269.

104. D. Calvetti and L. Reichel (1998) A hybrid iterative method for symmetric indefinite linear systems ,J. Comput. Appl. Math. bf 92 109-133.

105. J. Baglama, D. Calvetti and L. Reichel (1998) Fast Leja points (with J. Baglama and L. Reichel), Elect.Trans. Numer. Anal. **7** 126-140.

106. J. Baglama, D. Calvetti, L. Reichel and A. Ruttan (1998) Computation of a few close eigenvalues of a large matrix with application to liquid crystal modeling, J. Comput. Phys. **146** 203-226.

107. D. Calvetti, N. Levenberg and L. Reichel (1997) Iterative methods for X-AXB = C, J. Comput. Appl. Math. **86** 73-101

108. D. Calvetti and L. Reichel (1997) Factorizations of Cauchy matrices, J. Comput. Appl. Math. **86** 102-124.

109. G.S. Ammar, D. Calvetti and L. Reichel (1996) Continuation methods for the computation of zeros of Szego polynomials, Linear Algebra Appl. **249** 125-155.

110. D. Calvetti and L. Reichel (1996) An application of ADI iterative methods to restoration of noisy images, SIAM J. Matrix Anal. Appl. **17** 165-186.

111. D. Calvetti and L. Reichel (1996) A hybrid method for symmetric positive definite linear systems,Numer. Algo. **11** 79-98.

112. D. Calvetti and L. Reichel (1996) Adaptive Richardson iteration based on Leja points, J. Comput. Appl. Math. **71** 267-286.

113. D. Calvetti and L. Reichel (1996) An adaptive Richardson iteration method for indefinite linear systems,Numer. Algo. **12** 125-149.

114. J. Baglama, D. Calvetti and L. Reichel (1996) Iterative methods for computing a few eigenvalues of a large, symmetric matrix, BIT **36** 400-421.

115. D. Calvetti and L. Reichel (1996) On the solution of Cauchy linear systems, Elec. Trans. Numer. Anal. 125-136.

116. G.S. Ammar, D. Calvetti and L. Reichel (1996) Continuation methods for the computation of zeros of Szego polynomials, Linear Algebra Appl. **249** 125-155.

117. D. Calvetti and L. Reichel (1996) On the solution of Cauchy systems of equations, Elec. Trans. Numer.Anal., **4** (1996) 125-136

118. D. Calvetti, E. Gallopoulos and L. Reichel: Incomplete partial fractions for parallel evaluation ofmatrix rational functions, J. Comput. Appl. Math. **59** (1995) 349-380.

119. D. Calvetti, G.H. Golub, L. Reichel (1994) Adaptive Chebyshev iterative methods for nonsymmetric linear systems based on modified moments, Numer. Math. **67** 21-40.

120. D. Calvetti, L. Reichel and D.C. Sorensen (1994) An implicitly restarted Lanczos algorithm for large symmetric eigenvalue problems, Electr. Trans. Numer. Anal. **2** 1-21.

121. D. Calvetti, L. Reichel (1994) Application of a block modified Chebyshev algorithm to the iterative solution of symmetric linear systems with multiple right hand side vectors, Numer. Math. **68** 3-16.

122. D. Calvetti, L. Reichel (1993) Fast inversion of Vandermonde-like matrices involving orthogonal polynomials, BIT **33** 473-484.

123. D. Calvetti (1992) A stochastic roundoff error analysis for the convolution, Math. Comp. **59** 569-582.

124. D. Calvetti and L. Reichel (1992) A Chebyshev-Vandermonde solver, Linear Algebra Appl. **172** 219-229.

125. D. Calvetti (1991) A stochastic roundoff error analysis for the fast Fourier transform, Math. Comp. **56** 755-774.

126. D. Calvetti (1991) Roundoff error for floating point representation of real data, Commun. in Statist.Theory and Methods **20** 2687-2696.

Book sections:

1. D. Calvetti and E. Somersalo (2015) Dimensional Analysis and Scaling. In Higham N (ed) *Princeton Companion in Applied Mathematics* Princeton University Press pp. 90–93.

2. D. Calvetti and E. Somersalo (2011) Statistical methods in imaging. In: O. Scherzer (Ed.): *Handbook of Mathematical Methods in Imaging* Springer Verlag, 913–957.

3. D. Calvetti and E. Somersalo (2010) Subjective Knowldege or Objective Belief? In: L. Biegler, G. Biros, O. Ghattas, M. Heinkenschloss, D. Keyes, B. Mallick, Y. Marzouk, L. Tenorio, B. van Bloemen Waanders, K. Willcox (eds) *Large-scale inverse problems and quantification of uncertainty.* John Wiley & Sons, Ltd, UK, 33Ð70.

4. R. Occhipinti, E. Somersalo and D. Calvetti (2009) Interpretation of NMR spectroscopy human brain data with multi-compartment computational model of cerebral metabolism. In: J.C. LaManna, M.A. Puchowicz, K. Xu, D.K. Harrison, D.F. Bruley (eds.): *Oxygen Transport to Tissue XXXII*, pp.249–54.

5. D. Calvetti, L. Reichel and F. Sgallari (2003) A modified companion matrix method based on Newton polynomials, in Fast Algorithms for Structured Matrices: Theory and Applications, ed. V.Olshevsky, Contemporary Mathematics, vol. 323, Amer. Math. Soc., Providence, RI 179-186.

6. D. Calvetti, B. Lewis, L. Reichel (2001) Partial eigenvalue assignment for large control systems,in Structured Matrices in Operator Theory, Numerical Analysis, Control, Signal and Image Processing, Contemporary Mathematics, vol. 280, Amer. Math. Soc., Providence, RI 241-254.

7. D. Calvetti, L. Reichel and Q. Zhang (1999) Iterative solution methods for large linear discrete ill-posed problems, in Applied and Computational Control, Signals and Systems I, ed. B.N. Datta, Applied and Computational Control, Signals and Circuit 313-367.

8. D. Calvetti and L. Reichel (1999) Exponential integration methods for large stiff systems of differential equations, in Iterative Methods in Scientific Computing IV, eds. D.R. Kincaid and A.C.Elster, IMACS Series in Computational and Applied Mathematics, vol. 5, IMACS, New Brunswick, NJ 237-243.

9. D. Calvetti, L. Reichel and Q. Zhang (1996) Iterative solution methods for ill-posed problems, in 12th Annual Review on Computational and Applied Electromagnetism ACES, 638-644.

10. D. Calvetti, L. Reichel and Q. Zhang (1994) An adaptive semiiterative method for symmetric semidefinite linear systems, in Approximation and Computation, ed. R.V.M. Zahar, Int'l Series of Numer. Math. 115, Birkhauser, Basel, 77-96.

11. D. Calvetti, G.H. Golub and L. Reichel (1993) Gaussian quadrature applied to adaptive Chebyshev iteration, in Iterative Methods for Sparse and Structured Problems, eds. G.H. Golub, A.Greenbaum and M. Luskin (eds) Springer, New York, 31-44.

12. D. Calvetti, L. Reichel and J. Petersen (1993) A parallel implementation of GMRES , in Numerical Linear Algebra and Scientific Computing, L. Reichel, A. Ruttan and R.S. Varga, (eds), de Gruyter, Berlin, 1993, 31-46.

Refereed conference proceedings:

1. Arnold A, Calvetti D and Somersalo E (2015) Vectorized and parallel particle filter SMC parameter estimation for stiff ODEs. AIMS Proc. (to appear).

2. D. Calvetti, J. Heino and E. Somersalo (2008) Computational modelling of cellular level metabolism. Proc. of the Applied Inverse Problems 2007: Theoretical and Computational Aspects. J. of Physics: Conference Series **124** 012011.

3. D. Calvetti, A. Kuceyeski and E. Somersalo (2008) A mathematical model of liver metabolism: from steady state to dynamic. Proc. of the Applied Inverse Problems 2007: Theoretical and Computational Aspects. J. of Physics: Conference Series **124** 012012

4. D. Calvetti, R. Occhipinti and E. Somersalo (2008) The inverse problem of brain energetics: ketone bodies as alternative substrates. Proc. of the Applied Inverse Problems 2007: Theoretical and Computational Aspects. J. of Physics Conference Series **124** 012013.

5. D. Calvetti and E. Somersalo (2008) Inverse problems and computational cell metabolic models: a statistical approach. Proc. of the Applied Inverse Problems 2007: Theoretical and Computational Aspects. J. of Physics: Conference Series **124** 012003.

6. D. Calvetti and E. Somersalo (2008) Recovery of shapes: hypermodels and Bayesian learning. Proc. of the Applied Inverse Problems 2007: Theoretical and Computational Aspects. J. of Physics: Conference Series **124** 012014.

7. D. Calvetti and E. Somersalo (2007) A unified Bayesian framework for algorithms to recover blocky signals. Advanced Signal Processing Algorithms, Architectures and Implementations XVII, edited by Franklin T. Luk, Proc. of SPIE vol. 6697, SPIE, Bellingham WA paper no. 6697-4 (10 pages).

8. D. Calvetti and E. Somersalo (2005) Local regularization and Bayesian hypermodels. Advanced Signal Processing Algorithms, Architectures and Implementations XV, edited by Franklin T. Luk, Proc. of SPIE vol. 5910, SPIE, Bellingham WA. 59100W-1 - 59100W-9.

9. D. Calvetti and E. Somersalo (2005) Bayesian image deblurring and boundary effects. Advanced Signal Processing Algorithms, Architectures and Implementations XV, edited by Franklin T. Luk, Proc. of SPIE vol. 5910, SPIE, Bellingham WA, 2005) 59100X-1 - 59100X-9.

10. D. Calvetti, B. Lewis and L. Reichel (2002) A hybrid GMRES and TV-norm based method for image restoration, in Advanced Signal Processing Algorithms, Architectures, and Implementations XII, ed. F.T. Luk, Proc. of SPIE vol.4791, SPIE, Bellingham, WA. 192-200.

11. D. Calvetti, B. Lewis and L. Reichel (2001) Krylov subspace iterative methods for nonsymmetric discrete ill-posed problems in image restoration, in Advanced Signal Processing Algorithms, Architectures, and Implementations XI, ed. F.T. Luk, Proc. of SPIE vol. 4474, SPIE, Bellingham WA. 224-233.

12. D. Calvetti, B. Lewis and L. Reichel (2000) Restoration of images with spatially invariant blur by the GMRES method, in Advanced Algorithms and Architectures for Signal Processing, ed. F.T. Luk, Proc.of SPIE, vol. 4116, SPIE, Bellingham WA. 2000, 364-374.

13. D. Calvetti, B. Lewis and L. Reichel (2000) An L-curve for the MINRES method, in Advanced Algorithms and Architectures for Signal Processing, ed. F.T. Luk, Proc. of SPIE, vol. 4116, SPIE, Bellingham WA. 2000 385-395.

14. D. Calvetti, B. Lewis and L. Reichel (2000) Partial eigenvalue assignment for large observer problems,in Proceedings CD of the Fourteenth International Symposium of Mathematical Theory of Networks and Systems, Perpignan, France. 5 pages.

15. D. Calvetti, B. Lewis and L. Reichel (1998) Smooth or abrupt: a comparison of regularization methods, in Advanced Signal Processing Algorithms, Architectures and Implementations VIII, ed. F.T.Luk, Proc. of SPIE, vol. 346, SPIE, Bellingham WA. 286-295.

16. D. Calvetti and L. Reichel (1997) Numerical aspects of some solution methods for large Sylvester- observer equations, Proceedings of 36th IEEE Conference on Decisions and Control, 4389-4393.

17. D. Calvetti, L. Reichel and Q. Zhang (1995) Iterative solution methods for ill-posed problems, in Advanced Signal Processing Algorithms, ed. F.T. Luk, Proc. of SPIE, vol. 2563, SPIE, Bellingham WA. 338–347.

18. G.S. Ammar, D. Calvetti and L. Reichel (1994) Computing the poles of autoregressive models from the reflection coefficients, in Proceedings of the Thirty-First Annual Allerton Conference on Communication, Control and Computing, University of Illinois at Urbana-Champaign Press, Urbana-Champaign, IL. 247-254.

19. D. Calvetti, L. Reichel and Q. Zhang: Conjugate gradient algorithms for symmetric inconsistent linear systems, in Proceedings of the Lanczos Centenary Conference, M.T. Chu, R.J. Plemmons, J.D. Brown and D.C. Ellison (eds), SIAM, Philadelphia. 267-272.

20. D. Calvetti, L. Reichel, F. Sgallari and G. Spaletta (1994) An iterative method for image recon- struction from projections, in Proceedings of the Fifth SIAM Conference on Applied Linear Algebra, SIAM, Philadelphia. 92–96.

21. G.S. Ammar, D. Calvetti and L. Reichel (1994) Continuation methods for the computation of zeros of Szego polynomials, in Orthogonal Polynomials on the Unit Circle: Theory and Applications, eds. M. Alfaro, A. Garcia, C. Jagels and F. Marcellan, University Carlos III de Madrid, Madrid.173-205.

22. D. Calvetti, E. Gallopoulos, L. Reichel (1993) Accuracy control for parallel evaluation of matrix rational functions, in Proceedings of the Sixth SIAM Conference on Parallel Processing for Scientific Computing, eds. R.F. Sincovec, D.E. Keyes, M.R. Leuze, L.R. Petzold and D.A. Reed, SIAM, Philadelphia. 652-655.

General publications:

1. D. Calvetti (2017) Quantifying Uncertainty in Numerical Analysis. SIAM News.

Selected recent conference presentations

1. SIAM Imaging Science, Bologna, Italy, June 2018. Minisymposium speaker

2. SIAM Uncertainty Quantification, Orange Grove, CA, April 2018. Minisymposium speaker.

3. IMA Special Workshop on Sensor Location in Distributed Parameter Systems, Minneapolis, MN, September 2017.

4. Central Valley Regional SIAMStudent Conference, UC Merced, CA, April 2017.

5. Parameter Estimation and Uncertainty Quantification for Dynamical Systems, Pittsburgh, PA, March 2017.

6. SIAM Uncertainty Quantification 2016, Plenary Speaker, Lausanne, Switzerland, April 2016.

7. SIAM Imaging Science, Albuquerque, NM, June 2016.

8. ICERM Workshop: "From the Clinic to Partial Differential Equations and Back: Emerging Challenges for Cardiovascular Mathematics", Providence, RI, USA, January 2014.

9. Isaac Newton Institute "Inverse Problems Follow Up Workshop (INVW06)", Cambridge, UK, February 2014.

10. Mathematical Biology Institute "CTW: Molecular to Systems Physiology". Columbus, OH, USA, May 2014.

11. International School on Magnetic Resonance and Brain Function. Ettore Majorana Foundation, Erice, Italy, May 18-24, 2014.

12. 10th AIMS Conference. Madrid, Spain, July 07-July 11, 2014.

13. Distinguished Lectures in Inverse Problems (DLIP), Helsinki, Finland, August 2014.

14. IPTA 2014, Bristol, UK August 2014.

Recent longer visits abroad

1. Università di Roma "La Sapienza", Italy, June 2016.

2. Basque Center for Applied Mathematics (BCAM), Bilbao, Spain, April 2015

3. Università di Roma "La Sapienza", Italy, Sept 2014–March 2015

4. Isaac Newton Institute, Cambridge, England, February 2014

5. Universidad Nacional del Litoral, Santa Fe, Argentina, Oct. 2011

6. Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, May 2011