

**THE INSTITUTE OF MATHEMATICS AND ITS
APPLICATIONS**

IMANA NEWSLETTER

**Newsletter of the Numerical Analysis Group of the
Institute of Mathematics and its Applications**

**Volume 36 Number 2
January 2012**

Contents

1	Happy New Year	1
2	Report on the 2011 Special Semester on Multiscale Simulation & Analysis in Energy and the Environment	1
3	Cecil King Travel Scholarship	2
4	Who's Visiting Whom	2
5	Technical Reports/ Publications	3
6	Diary of Seminars (January - April 2012)	7
7	Forthcoming Meetings and Conferences	9
8	Highlighted Conferences and Workshops	12
9	Summer Schools, Courses and Other Events	15
10	Software News	16
11	PhD Theses	18
12	Recent appointments	19
13	Vacant positions and studentships	19
14	Postgraduate Courses	20
15	IMA Journal of Numerical Analysis	20
16	Acknowledgements	21

1 Happy New Year

Many thanks to all those who have contributed to the Newsletter over the past year. Please continue to send news items that you feel will be of interest to the UK NA community. The copy date for the next Newsletter will be **Monday, 2 April**. As always, contributions from individuals as well as groups/departments are very welcome. Please use the newsletter as an opportunity to tell the community about NA-related activities in the UK.

Jennifer Scott (jennifer.scott@stfc.ac.uk)
 Group Leader, Numerical Analysis Group
 Rutherford Appleton Laboratory, Didcot, Oxfordshire OX11 0QX

2 Report on the 2011 Special Semester on Multiscale Simulation & Analysis in Energy and the Environment

From October to December 2011 a Special Semester on Multiscale Simulation & Analysis in Energy and the Environment was held at the Johann Radon Institute for Computational and Applied Mathematics (RICAM) in Linz, Austria. Over 200 researchers from almost 40 different countries contributed to this activity, some as long term guests for the whole semester and some for a shorter period of time or as participants of one or more of the 4 workshops that were held during those 3 months. The long term guests included established specialists in the field as well as young researchers and PhD students who obtained scholarships to participate in the Special Semester. In addition, the research staff and PhD students of the RICAM were involved in the activities.

The RICAM has been holding very successful Special Semesters dedicated to various areas from applied sciences over the past seven years. The goal of these one semester programs is to provide a stimulating research atmosphere and to encourage co-operations between science and industry and within science that lead to new mathematical results and solutions to important problems.

The main topics of the 2011 Special Semester were:

- Simulation of Flow in Porous Media and Applications in Waste Management and CO₂ Sequestration,
- Large-Scale Inverse Problems and Applications in the Earth Sciences,
- Data Assimilation and Multiscale Simulation in Atmospheric Flow,
- Wave Propagation and Scattering, Direct and Inverse Problems and Applications in Energy and the Environment,
- Multiscale Numerical Methods and their Analysis and Applications in Energy and the Environment,
- Stochastic Modelling of Uncertainty and Numerical Methods for Stochastic PDEs,

It attracted applied mathematicians as well as civil engineers, hydrologists, meteorologists, geologists and other environmental scientists. Activities that took place during the Special Semester were:

- Four thematic workshops addressing some of the key topics of the Special Semester.
- A Special Lecture Series on “Multilevel Methods for Multiscale Problems”, which ran over the whole semester where some of the long term guests presented their research to other guests, local RICAM research staff and students.
- A Graduate Seminar on “Multiscale Discretisation Techniques”, where visiting and local graduate students studied and presented key papers on the topic.
- A weekly “Research Kitchen” where new ideas were presented and common questions/problems were discussed in an informal setting.

- A Public Lecture on “Tsunami Früh-Warnung: Mathematik und Wissenschaftliches Rechnen im Dienste der Sicherheit” (Tsunami Early Warning Systems: Mathematics & Scientific Computing Serving the Safety of the Community) given by Prof. Jörn Behrens from KlimaCampus, Universität Hamburg. This lecture was aimed to engage also the wider research community and the general public in Linz with the topic of the special semester and it was very well received.

But the highlights of the Semester were certainly the four workshops on:

- Simulation of Flow in Porous Media and Applications in Waste Management and CO₂ Sequestration,
- Large-Scale Inverse Problems and Applications in the Earth Sciences,
- Wave Propagation and Scattering, Inverse Problems and Applications in Energy and the Environment,
- Numerical Analysis of Multiscale Problems & Stochastic Modelling.

All of the workshops were presenting research at the international forefront of the respective topic with presentations from the leading figures, and they were hailed by the participants for their extremely high quality and focus.

The Special Semester was organised and chaired by Prof Robert Scheichl (Bath) with the help of an external and a local organizing committee. The other external organisers were Prof Peter Bastian (Heidelberg), Prof Mike Cullen (UK MetOffice), Dr Melina Freitag (Bath), Prof Ivan Graham (Bath), Prof Markus Melenk (TU Vienna) and Prof Mary Wheeler (UT Austin). However, the activity would not have been possible without the financial, technical and local support of the RICAM, led by Prof Heinz W. Engl. We would like to take this opportunity to thank the dedicated and excellent local organisation team Prof Ulrich Langer (Deputy leader of the RICAM), Susanne Dujardin, Dr Jörg Willems, Dr Erwin Karer as well as Wolfgang Forsthuber and Florian Tischler for the brilliant work they have been doing during those three months.

A full list of participants, the programme of the Special Semester, more information on the workshops and the associated Graduate Seminar, Special Lecture Series and Research Kitchen, in particular *slides of talks* are available at <http://www.ricam.oeaw.ac.at/specsem/specsem2011/>

Melina Freitag and Robert Scheichl

3 Cecil King Travel Scholarship

The London Mathematical Society awards a 5000 GBP Cecil King Travel Scholarship in Mathematics annually to a young mathematician of outstanding promise. The Scholarship is awarded to support a period of study or research abroad, typically for a period of three months. Please note that ordinarily, applicants for the Cecil King Travel Scholarship must be a citizen of the UK or Republic of Ireland. Applications for the 2012 Scholarship are now open. The deadline for applications is Friday 2 March 2012.

For more information, visit the LMS website at <http://www.lms.ac.uk/content/cecil-king-travel-scholarship>

4 Who's Visiting Whom

Cambridge

Hans Munthe-Kaas (University of Bergen), academic year 2011–12. Geometric numerical integration, harmonic analysis in Lie groups, symmetries in numerical algebra. Host: A Iserles.

Lena Mul (Tarnopil University) January–July 2012. Aapproximation theory, highly oscillatory phenomena. Host: Arieh Iserles

Bin Wang (Nanjing University) October 2011–July 2012. Numerical ODEs. Host: Arieh Iserles

Antonella Zanna (University of Bergen), academic year 2011–12. Geometric numerical integration, image processing and registration. Host: A Iserles.

Oxford

Dr Stefan Guettel (currently at University of Geneva, Switzerland) is working with Nick Trefethen from June 2011 to May 2013.

Dr Christian Kreuzer, Ruhr-University of Bochum, Germany, 1 September 2011 to 31 March 2012.
Host: Professor Endre Suli.

5 Technical Reports/ Publications

University of Cambridge

Reports available from <http://www.damtp.cam.ac.uk/user/na/reports.html>

- NA2011/17 B. Adcock, A. C. Hansen, E. Herrholz and G. Teschke.
Generalized sampling: extension to frames and inverse and ill-posed problems.
- NA2011/16 M.J.D. Powell.
The Lagrange method and SAO with bounds on the dual variables.
- NA2011/15 A. Iserles and K. Kropielnicka.
Effective approximation for linear time-dependent Schrödinger equation.
- NA2011/14 S. Altinbasak, M. Condon, A. Deano and A. Iserles.
Highly oscillatory diffusion-type equations.
- NA2011/13 B. Adcock, A. C. Hansen, E. Herrholz and G. Teschke.
Generalized sampling, infinite-dimensional compressed sensing, and semi-random sampling for asymptotically incoherent dictionaries.
- NA2011/12 B. Adcock and A. C. Hansen.
Generalized sampling and the stable and accurate reconstruction of piecewise analytic functions from their Fourier coefficients.
- NA2011/11 M. Condon, A. Deano, J. Gao and A. Iserles.
Asymptotic solvers for ordinary differential equations with multiple frequencies.
- NA2011/10 B. Adcock and A. C. Hansen.
Sharp bounds, optimality and a geometric interpretation for generalised sampling in Hilbert spaces.

Cardiff University

- 11/04 S. J. Lind and T. N. Phillips.
Bubble collapse in compressible viscoelastic fluids using a spectral element marker particle method.
Part 2. Viscoelastic Fluids.

University of Edinburgh

Reports available from <http://www.maths.ed.ac.uk/ERGO/preprints.html>

- ERGO 11-013 C. Cartis, N.I.M. Gould and Ph.L. Toint.
A note about the complexity of minimizing Nesterov's smooth Chebyshev-Rosenbrock function.
- ERGO 11-014 N.-Y. Chiang and A. Grothey.

Solving security constrained optimal power flow problems by a structure exploiting interior point method.

- ERGO 11-015 P.A. Trodden, W.A. Bukhsh, A. Grothey and K.I.M. McKinnon.
MILP formulation for islanding of power networks.
- ERGO 11-016 P.A. Trodden, W.A. Bukhsh, A. Grothey and K.I.M. McKinnon.
MILP islanding of power networks by bus splitting.
- ERGO 11-017 W.A. Bukhsh, A. Grothey, K.I.M. McKinnon and P.A. Trodden.
Local solutions of optimal power flow.
- ERGO 11-018 V. Gunnerud, B.A. Foss, K.I.M. McKinnon and B. Nygreen.
Oil production optimization solved by piecewise linearization in a branch and price framework.
- ERGO 11-019 R. Paulavicius, J. Zilinskas and A. Grothey.
Parallel branch and bound for global optimization with combination of Lipschitz bounds.
- ERGO 11-020 A. Grothey.
Massively parallel asset and liability management.

University of Liverpool

Reports available from http://www.liv.ac.uk/~cmchenke/na_liverpool.htm

University of Manchester

MIMS EPrints from <http://www.manchester.ac.uk/mims/eprints>

Preprints with AMS Mathematics Subject Classification 65: Numerical Analysis.

- 2011.117: Timo Betcke, Nicholas J. Higham, Volker Mehrmann, Christian Schroder and Francoise Tisseur
NLEVP: A Collection of Nonlinear Eigenvalue Problems. Users' Guide.
- 2011.116: Timo Betcke, Nicholas J. Higham, Volker Mehrmann, Christian Schroder and Francoise Tisseur
NLEVP: A Collection of Nonlinear Eigenvalue Problems.
- 2011.115: Yuji Nakatsukasa
Gerschgorin's theorem for generalized eigenvalue problems in the Euclidean metric.
Mathematics of Computation, 80 (276). pp. 2127-2142.
- 2011.114: Yuji Nakatsukasa
The tan theta theorem with relaxed conditions.
- 2011.113: Yuji Nakatsukasa, Naoki Saito and Ernest Woei
Mysteries around the graph Laplacian eigenvalue 4.
- 2011.112: D. Steven Mackey
The Continuing Influence of Fiedler's Work on Companion Matrices.
- 2011.110: Fernando De Teran, Froilan Dopico and D. Steven Mackey
Fiedler companion linearizations for rectangular matrix polynomials.
- 2011.104: David Silvester, Alexei Bespalov and Catherine E. Powell
A framework for the development of implicit solvers for incompressible flow problems.
- 2011.103: Yuji Nakatsukasa and Nicholas J. Higham

- Backward stability of iterations for computing the polar decomposition.
- 2011.102: Nicholas Dingle
GPU-based solution of Continuous Time Markov Chains using CUSP.
- 2011.91: Alexei Bespalov, Catherine E. Powell and David Silvester
A priori error analysis of stochastic Galerkin mixed approximations of elliptic PDEs with random data.
- 2011.90: Nicholas J. Dingle and Nicholas J. Higham
Reducing the Influence of Tiny Normwise Relative Errors on Performance Profiles.
- 2011.89: Maha Al-Ammari
Analysis of Structured Polynomial Eigenvalue Problems. PhD thesis, Manchester Institute for Mathematical Sciences, The University of Manchester.
- 2011.86: Sven Hammarling, Christopher J. Munro and Françoise Tisseur
An Algorithm for the Complete Solution of Quadratic Eigenvalue Problems.
- 2011.85: Yuji Nakatsukasa
On the condition numbers of a multiple eigenvalue of a generalized eigenvalue problem.
- 2011.84: Yuji Nakatsukasa, Kensuke Aishima and Ichitaro Yamazaki
dqds with aggressive early deflation.
- 2011.83: Awad H. Al-Mohy and Nicholas J. Higham
Improved Inverse Scaling and Squaring Algorithms for the Matrix Logarithm.
- 2011.82: Iain Bethune, J. Mark Bull, Nicholas J. Dingle and Nicholas J. Higham
Investigating the Performance of Asynchronous Jacobi's Method for Solving Systems of Linear Equations.
- 2011.81: Yuji Nakatsukasa
Eigenvalue perturbation bounds for Hermitian block tridiagonal matrices.
- 2011.80: David Silvester and Qifeng Liao
Robust Stabilized Stokes Approximation Methods for Highly Stretched Grids.

Oxford University

Reports available from <http://eprints.maths.ox.ac.uk/view/groups/nag/>

- NA-11/13 J Pestana and A J Wathen.
Combination preconditioning of saddle point systems for positive definiteness.
- NA-11/14 P Gonnet, S Guettel and L N Trefethen.
Robust Pade approximation via SVD.
- NA-11/15 J W Pearson and A J Wathen.
Fast iterative solvers for convection-diffusion control problems.
- NA-11/16 C Makridakis and E Suli.
Finite element analysis of Cauchy-Born approximations to atomistic models.
- NA-11/17 C Schwab and E Suli.
Adaptive Galerkin approximation algorithms for partial differential equations in infinite dimensions.

- NA-11/18 A Eisentraeger, I Sobey and M Czosnyka.
Parameter estimations for cerebrospinal fluid infusion test.
- NA-11/19 C Kreuzer.
Reliable and efficient a posteriori error estimates for finite element approximations of the parabolic p-Laplacian.

Newcastle University

Recent publications:

- O. Turan, R. J. Poole, N. Chakraborty, Influences of boundary conditions on the aspect ratio effects in laminar natural convection in rectangular enclosures with differentially heated side walls. *International Journal of Heat and Fluid Flow* (accepted).
- H. Hesse, S. P. Malkeson, N. Chakraborty, Displacement speed Statistics for Stratified mixture Combustion in an Igniting Turbulent Planar Jet. *ASME Journal of Engineering for Gas Turbines and Power* (accepted).
- N. Chakraborty, A. Lipatnikov, Statistics of conditional fluid velocity in the corrugated flamelets regime of turbulent premixed combustion: A Direct Numerical Simulation study, *Journal of Combustion*, 628208, 2011.
- S.P. Malkeson, N. Chakraborty, Statistical analysis of cross scalar dissipation rate transport in turbulent partially premixed flames: A Direct Numerical Simulation study. *Flow Turbulence and Combustion*, 87,313-349,2011.
- N. Chakraborty, M. Katragadda, R.S. Cant, Statistics and modelling of turbulent kinetic energy transport in different regimes of premixed combustion *Flow Turbulence and Combustion*, 87,205-235, 2011.
- N. Chakraborty, N. Swaminathan, Effects of Lewis number on scalar variance transport in turbulent premixed flames, *Flow Turbulence and Combustion*, 87, 261-292, 2011.

University of Reading

Preprints available from <http://www.reading.ac.uk/math-and-stats/research/math-preprints.aspx>

- MPS-2011-12 Superfast non-linear diffusion model of capillary transport in particulate porous media.
A.V. Lukyanov, M.M. Sushchikh, M.J. Baines and T.G. Theofanous.
- MPS-2011-13 Resolution of sharp fronts in the presence of model error in variational data assimilation.
M.A. Freitag, N.K. Nichols and C.J. Budd.
- MPS-2011-14 Competing Edge Networks.
Mark Parsons and Peter Grindrod.
- MPS-2011-16 Data assimilation for state and parameter estimation: application to morphodynamic modelling.
P.J. Smith, G.D. Thornhill, S.L. Dance, A.S. Lawless, D.C. Mason and N.K. Nichols.
- MPS-2011-18 A High Frequency hp Boundary Element Method for Scattering by Convex Polygons".
D.P. Hewett, S. Langdon and J.M. Melenk.

Rutherford Appleton Laboratory

Reports available from <http://www.stfc.ac.uk/CSE/randd/nag/36276.aspx>

- RAL-TR-2011-026 M. Arioli, I.S. Duff, J.D. Hogg and H.S. Thorne.
Guidelines for the development of MATLAB interfaces for HSL packages
(revised for MATLAB 2011a).

- RAL-TR-2011-024 J. D. Hogg and J. A. Scott.
HSL_MA97 : a bit-compatible multifrontal code for sparse symmetric systems.
- RAL-TR-2011-023 I. S. Duff.
European Exascale Software Initiative: numerical libraries, solvers, and algorithms.
- RAL-TR-2011-022 P. A. Browne, C. J. Budd, N. I. M. Gould, H. A. Kim and J. A. Scott.
A fast method for binary programming using first order derivatives, with application to topology optimization with buckling constraints.
- RAL-TR-2011-020 J. M. Fowkes, N. I. M. Gould and C. L. Farmer.
A branch and bound algorithm for the global optimization of Hessian Lipschitz continuous functions.
- RAL-TR-2011-019 J. A. Scott and Y. Hu.
Level-based heuristics and hill climbing for the antibandwidth maximization problem.
- Internal report 2011-1 J. D. Hogg.
C interfaces to HSL routines.

University of Strathclyde

Available from <http://www.mathstat.strath.ac.uk/research/reports>

6 Diary of Seminars (January - April 2012)

BATH Numerical Analysis Seminars: Seminars take place on Fridays at 12:15pm in Department of Mathematical Sciences, Building 4 West, Room 4W1.7 (Wolfson Lecture Theatre). The timetable is available at <http://people.bath.ac.uk/eas25/naseminar.html>

BIRMINGHAM : The Optimisation and Numerical Analysis seminar at Birmingham run on Thursdays, between 12-1pm in Arts Lecture Room 6, Edgbaston Campus at the University of Birmingham. The programme can be found at <http://web.mat.bham.ac.uk/loghin/onaseminars.html>

BRUNEL : Two seminar series are held in the Department of Mathematical Sciences, John-Crank Building, Room M128. The Applied Mathematics Research Seminars take place on Mondays at 14:00, and the Seminars on Mathematical Physics and Random Matrices are held on Tuesdays at 16:00. More details are available at <http://www.brunel.ac.uk/about/acad/siscm/math/events>

CAMBRIDGE : For information, see <http://talks.cam.ac.uk/show/index/26898> and <http://talks.cam.ac.uk/show/index/9811> Seminars are usually held on Thursdays at 3pm in MR14, Centre for Mathematical Sciences.

CARDIFF : Seminars take place on Tuesdays at 4pm in School of Mathematics room M/2.06. Contact: Tim Phillips (phillipstn@cf.ac.uk).

DURHAM : Durham NA seminars take place by default on Fridays at 14:15 in E102, but interested visitors should confirm the time and location with Abigail Wachter (abigail.wachter@durham.ac.uk) beforehand.

EDINBURGH : The Edinburgh Research Group in Optimization (ERGO) runs seminars on Optimization and Numerical Analysis. Seminars are usually on Wednesdays at 3.30pm in Room 6206 of the James Clerk Maxwell Building. More details are available from: <http://www.maths.ed.ac.uk/ERGO/seminars.html>

LIVERPOOL : Seminars are normally held on Wednesdays at 4pm, in the Whittaker Room (211), Mathematical Sciences Building.

See <http://www.liv.ac.uk/maths/Applied/Research/Seminars/index.html>

MANCHESTER : Numerical Analysis and Scientific Computing Seminars are held in the in the Alan Turing Building, Frank Adams Room 1, at 3pm. For more details and abstracts, see <http://www.mims.manchester.ac.uk/events/seminars/numerical-analysis.php>

OXFORD : Unless stated otherwise, seminars take place on Thursdays at 2pm in the Seminar Room RI.0.48, Gibson Building. For further information contact Lotti Ekert (Lotti.Ekert@maths.ox.ac.uk). A timetable and abstracts are available from <http://www.maths.ox.ac.uk/events/seminars/>

RAL : Seminars are normally held in the Atlas Centre, Rutherford Appleton Laboratory and start at 2pm. Contact: karen.mcintyre@stfc.ac.uk or jennifer.scott@stfc.ac.uk

READING : Seminars take place on Tuesdays promptly at 4pm in room 113 of the Mathematics Department. External audiences are advised to contact Brigitte Calderon on 0118 378 5002 or email b.calderon@reading.ac.uk to confirm the programme before attending. Further details available at <http://www.reading.ac.uk/math/news/AppMathsNumAnalSeminars.aspx>

Please note that, at the time of writing, not many people had fully sorted out their seminar series for this coming term so you are advised to check the given websites for details of titles and of further seminars as they become available.

JANUARY 2012

JANUARY 12 : OXFORD. Timo Betcke, UCL. TBC.

JANUARY 17 : READING. Jennifer Scott, STFC Rutherford Appleton Laboratory.
Antibandwidth maximization: a graph colouring problem.

JANUARY 19 : RAL. Jennifer Scott, STFC Rutherford Appleton Laboratory.
Antibandwidth maximization: a graph colouring problem.

FEBRUARY 2012

FEBRUARY 2 : OXFORD. Cora Cartis, Edinburgh. TBC.

FEBRUARY 7 : READING. Dmitri Vassiliev, UCL. Problems in the spectral theory of differential operators.

FEBRUARY 9 : RAL. Yuji Nakatsukasa, Manchester.
Efficient, communication-minimizing algorithms for the symmetric eigenvalue decomposition and the singular value decomposition.

FEBRUARY 10 : MANCHESTER. Alastair Spence, Bath. TBC.

FEBRUARY 16 : OXFORD. Spencer Sherwin, Imperial College. TBC.

FEBRUARY 21 : CARDIFF. Penny Davies, Strathclyde.
Convolution quadrature revisited for integral and boundary integral equations.

FEBRUARY 23 : OXFORD. Stephen Langdon, Reading. TBC.

MARCH 2012

MARCH 1 : OXFORD. Paul Houston, Nottingham. TBC.

MARCH 8 : OXFORD. Rosie Renaut, Arizona State University. TBC.

MARCH 13 : READING. Nick Trefethen, Oxford. Robust Pade approximation via SDV.

MARCH 21 : CARDIFF. Fehmi Cirak, Cambridge.
Subdivision-stabilised Immersed B-Spline Finite Elements for Fluid-Structure Interaction.

7 Forthcoming Meetings and Conferences

JANUARY 2012

10th Bath RAL NA Day, January 30.

Rutherford Appleton Laboratory, Oxfordshire. <http://www.stfc.ac.uk/CSE/randd/nag/38093.aspx>

FEBRUARY 2012

SIAM Conference on Parallel Processing for Scientific Computing (PP12), February 15–17.

Savannah, Georgia. <http://www.siam.org/meetings/pp12/>

10th International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing (MCQMC 2012), February 13–17.

Sydney, Australia. <http://www.mcqmc2012.unsw.edu.au/>

GPU Computing, PDP 2012, February 14–17.

Garching/Munich, Germany. <http://conf.laas.fr/GPU/>

ACE2012 7th Workshop on Advanced Computational Electromagnetics, February 29–March 2.

Karlsruhe Institute of Technology (KIT), Germany. <http://ace2012.math.kit.edu/>

MARCH 2012

5th International Conference on High Performance Scientific Computing, March 5–9.

Vietnam Academy of Science and Technology, Hanoi.

<http://hpsc.iwr.uni-heidelberg.de/HPSCHanoi2012>

4th international conference on Mathematical Sciences ICM-2012, March 11–14.

United Arab Emirates University, Al-Ain. <http://icm.uaeu.ac.ae/>

IMA MATHEMATICS 2012, March 22.

Mary Ward House, 5-7 Tavistock Place, London.

http://www.ima.org.uk/conferences/conferences_calendar/mathematics_2012.cfm

12th Copper Mountain Conference on Iterative Methods, March 25–30.

Copper Mountain, Colorado, USA <http://grandmaster.colorado.edu/~copper/2012/>

7th Postgraduate Numerical Analysis Day, March 30.

Reading. Contact: Stephen Langdon (s.langdon@reading.ac.uk)

APRIL 2012

8th International Conference on Scientific Computing and Applications, April 1–4.

University of Nevada Las Vegas (UNLV). <http://www.unlv.edu/centers/cams/sca2012/sca2012.html>

Sixth meeting of the EPSRC network on Matrix and Operator Pencils, MOPNET, April 2–3.

Bath. <http://mopnet.cf.ac.uk/meeting6.html>

SIAM Conference on Uncertainty Quantification (UQ12), April 2–4.

Raleigh, North Carolina, USA. <http://www.siam.org/meetings/uq12/>

Advances in Scientific Computing, Imaging Science and Optimization, April 4–6.

UCLA, Los Angeles. <http://www.ipam.ucla.edu/programs/sjo2012/>

International Finance Banking and Insurance Congress, April 19–22.

Antalya, Turkey. <http://www.fibacturkey.org>

SIAM International Conference on Data Mining (SDM12), April 26–28.

Anaheim, California. <http://www.siam.org/meetings/sdm12/>

MAY 2012**50th European Two Phase Flow Group (50-ETPFGM), May 16–18.**

Udine, Italy. <http://158.110.32.35/ETPFGM-12/index.html>

3rd Conference on Optimization Methods and Software, May 13–17.

Crete, Greece. http://www.ise.ufl.edu/cao/OMS12/OMS_2012/Welcome.html

Workshop: Particles in Turbulence, May 14–16.

Lorentz Center, Leiden University, Netherlands. <http://www.lorentzcenter.nl/>

Applied Mathematics and Approximation Theory 2012, May 17–19.

Ankara, Turkey. <http://amat2012.etu.edu.tr/>

Workshop Parallel Computing and Optimization, PCO'12, May 21–25.

Shanghai, China. <http://conf.laas.fr/PCO12/index.html>

JUNE 2012**International Conference on Computational Science (ICCS 2012),**

June 4–6.

Omaha, Nebraska, USA. <http://www.iccs-meeting.org/iccs2012>

PARA 2012 Workshop on state-of-the-art in scientific and parallel computing,

June 10–13.

Helsinki, Finland. <http://www.csc.fi/english/csc/courses/archive/para2012>

AMiTaNS'12, June 11–16.

St.St. Constantine and Helena, Varna, Bulgaria. <http://2012.eac4amitans.eu/>

SIAM Conference on Discrete Mathematics (DM12), June 18–21.

Dalhousie University, Halifax, Nova Scotia, Canada. <http://www.siam.org/meetings/dm12/>

SIAM Conference on Applied Linear Algebra (LA12), June 18–22.

Valencia, Spain. <http://siamla2012.webs.upv.es/>

Sparse Days at CERFACS, June 25–26.

Toulouse, France. <http://www.cerfacs.fr/6-25708-Home.php>

European Seminar on Computing (ESCO 2012), June 25–29.

Pilsen, Czech Republic. <http://esco2012.femhub.com>

JULY 2012**Advances in Computational Heat Transfer: CHT-12, July 1–6.**

Bath. <http://www.ichmt.org/cht-12>

Conference honoring Nancy Nichols' 70th, July 2–3.

Reading. <http://www.reading.ac.uk/math-and-stats/news/nancy70.html>

IUTAM Symposium Understanding Common Aspects of Extreme Events in Fluids, July 2–6.

Dublin. <http://mathsci.ucd.ie/~miguel/IUTAM2012/index.html>

Summer School: Stochastic Methods in Fluid Mechanics, 2–6 July 2012

Udine, Italy. <http://www.cism.it/courses/C1206/>

Numerical Software: Design, Analysis and Verification, 4–6 July 2012
Santander, Spain. <http://www.nsc.liu.se/wg25/>

16th International Congress on Computational and Applied Mathematics (ICCAM-2012), July 9–13.

University of Ghent, Belgium. <http://www.iccam.ugent.be/>

SIAM Annual Meeting, July 9–13.

Minneapolis, Minnesota, USA. <http://www.siam.org/meetings/an12/>

International Conference on Computational Science, July 16–20.

Shanghai, China. <http://www.eicssu.org/ICCS-2012/>

10th International Meeting on High-Performance Computing for Computational Science (VECPAR 2012), July 17–20.

RIKEN Advanced Institute for Computational Science (AICS) Kobe, Japan.

<http://nkl.cc.u-tokyo.ac.jp/VECPAR2012/>

6th International Symposium on Symbolic and Algebraic Computation, July 22–25.

Grenoble, France. <http://www.issac-conference.org/2012/>

6th International Conference on Automatic Differentiation, AD2012, July 23–27.

Fort Collins, CO, USA. <http://www.autodiff.org/ad12/>

34th International Combustion Symposium, July 29–Aug 3.

Warsaw University, Poland. <http://www.combustion2012.itc.pw.edu.pl/>

AUGUST 2012

International Conference on Advances in Computing, Communications and Informatics (ICACCI-2012), August 3–5.

Chennai, India. <http://www.icacci-conference.org>

SEPTEMBER 2012

9th European Fluid Mechanics Conference, September 9–13.

Rome. <http://www.efmc9.eu/>

3rd IMA Conference on Numerical Linear Algebra and Optimisation, September 10–12.

University of Birmingham.

http://www.ima.org.uk/conferences/conferences_calendar/numerical_linear_algebra_and_optimisation.cfm

7th International Symposium on Turbulence, Heat and Mass Transfer, THMT-12, September 24–27.

Palermo, Sicily, Italy. <http://www.thmt-12.org/>

JUNE 2013

MAFELAP 2013, June 11–14.

Brunel University, London. <http://www.brunel.ac.uk/mafelap2013>

8th International Conference on Preconditioning Techniques (Precond 2013), June 19–21.

St Anne's College, Oxford. Contact: egng@lbl.gov

8 Highlighted Conferences and Workshops

Bath-RAL Numerical Analysis Day, 30 January 2012 Rutherford Appleton Laboratory

The annual Bath-RAL NA Day is now a well-established UK event. This year the meeting will be held at RAL on 30 January. All our welcome. There is no registration fee but please email mario.arioli@stfc.ac.uk if you plan to attend so that the relevant security and refreshment arrangements can be made.

The speakers will be:

- Paul Van Dooren (Catholic University of Louvain). TBA.
- Nick Gould (Rutherford Appleton Laboratory). Trajectory-following methods for large-scale degenerate quadratic programming.
- Elisabeth Ullmann (Bath). Multilevel Monte-Carlo Methods for Groundwater Flow Problems in Random Media.
- Françoise Tisseur (University of Manchester). Triangularization of matrix polynomials.
- Alastair Spence (Bath). Identifying Hopf Bifurcations in models of incompressible flow.
- Iain Duff (Rutherford Appleton Laboratory). Preconditioners Based on Strong Subgraphs.

Full details are available at http://www.cse.scitech.ac.uk/nag/bath_ral.shtml

Sparse Days at CERFACS, 24–26 June 2012 Toulouse, France

The annual Sparse Days at CERFACS will take place on the 25th and 26th of June, just after the SIAM Applied Linear Algebra meeting in Valencia. The Sparse Days meeting will be similar in format to previous years. No invited speakers and all talks in plenary session. The current plan is to have no registration fee and there will be very cheap on-site accommodation available.

A web page on the CERFACS Algo site (<http://www.cerfacs.fr/6-25708-Home.php>) will be available for registration by mid-January.

Iain Duff (duff@cerfacs.fr)

Conference honoring Nancy Nichols' 70th, 2–3 July 2012 University of Reading

Registration is now open for the two-day meeting that is being held in honour of Nancy Nichols' 70th birthday. The meeting will celebrate Nancy's contributions to control theory, numerical linear algebra and data assimilation.

Confirmed speakers include:

- Angelika Bunse-Gerstner (Bremen)
- Volker Mehrmann (TU-Berlin)
- Michael Overton (NYU)
- Paul van Dooren (Louvain)
- Andy Wathen (Oxford).

Further details are available on the conference webpage: <http://www.reading.ac.uk/math-and-stats/news/nancy70.html>

Organizing committee: Mike Baines, Steve Langdon, Amos Lawless.

**6th International Conference on Automatic Differentiation
July 23–27, 2012 Fort Collins, Colorado, USA**

Automatic Differentiation (AD) is a technology for automatically augmenting computer programs, including arbitrarily complex simulations, with statements for the accurate and efficient computation of derivatives also known as sensitivities. The next quadrennial international conference on AD will take place in 2012 and papers are solicited on all aspects of AD including:

- Foundations of automatic differentiation
- Automatic differentiation and iterative processes
- Non-smooth analysis
- Sparsity and scarcity
- Higher-order derivatives
- Combinatorial problems in automatic differentiation
- Complexity of differentiated programs
- Recomputation schemes
- Source code analysis for automatic differentiation
- Adaptation to new hardware architectures
- Tool development
- Applications in science, engineering, and finance; especially ODE, DAE, inverse problems, and optimization

Proceedings of all accepted papers will be published in Springer's Lecture Notes in Computational Science and Engineering series.

Confirmed invited speakers are:

- Lorenz Biegler, Carnegie Mellon University, Pittsburgh PA, USA
- Luca Capriotti, Credit Suisse, New York NY, USA
- Don Estep, Colorado State University, Fort Collins CO, USA
- Mary Hall, University of Utah, Salt Lake City UT, USA
- Barbara Kaltenbacher, University of Graz, Austria
- Markus Puschel, ETH Zurich, Switzerland
- Siegfried Rump, Hamburg University of Technology, Germany
- Bert Speelpenning, MathPartners, Seattle, USA

For more details, see <http://www.autodiff.org/ad12/>

Shaun Forth (S.A.Forth@cranfield.ac.uk) on behalf of AD2012.

**3rd IMA Conference on Numerical Linear Algebra and Optimisation.
10–12 September, University of Birmingham.**

The success of modern codes for large-scale optimisation is heavily dependent on the use of effective tools of numerical linear algebra. On the other hand, many problems in numerical linear algebra lead to linear, nonlinear or semidefinite optimisation problems. The purpose of the conference is to bring together researchers from both communities and to find and communicate points and topics of common interest.

Conference topics include any subject that could be of interest to both communities, such as:

- Direct and iterative methods for large sparse linear systems.
- Eigenvalue computation and optimisation.
- Large-scale nonlinear and semidefinite programming.
- Effect of round-off errors, stopping criteria, embedded iterative procedures.

- Optimisation issues for matrix polynomials.
- Fast matrix computations.
- Compressed/sparse sensing.
- PDE-constrained optimisation.
- Applications and real time optimisation.

Confirmed invited speakers:

- Roland Freund (University of California, Davis)
- Philip Gill (University of California, San Diego)
- Serge Gratton (CERFACS, Toulouse)
- Anne Greenbaum (University of Washington, Seattle)
- Michael Hintermueller (Humboldt University, Berlin)
- Sabine van Huffel (K.U. Leuven) Mike Powell (University of Cambridge)
- Andrea Walther (University of Paderborn)

Mini-symposium proposals and contributed talks are invited on all aspects of numerical linear algebra and optimisation. Mini-symposium proposals in plain text/LaTeX should be submitted to conferences@ima.org.uk by 30 March 2012. Organisers will be advised of acceptance by 10 April 2012. Contributed talks and mini-symposia talks will be accepted on the basis of a half-page extended abstract in plain text/LaTeX which should be submitted by 30 April 2012 online at <http://online.ima.org.uk/> or by e-mail to conferences@ima.org.uk. Authors will be advised of acceptance by 30 May 2012. A book of abstracts will be made available to delegates at the conference.

If you have any queries regarding this conference or would like to register your interest, please contact Lizzi Lake, Conference Officer (conferences@ima.org.uk). Further details at http://www.ima.org.uk/conferences/conferences_calendar/numerical_linear_algebra_and_optimisation.cfm

First announcement: MAFELAP 2013
11–14 June 2013, Brunel University, London.

We are pleased to announce that MAFELAP 2013, the 14th conference on the Mathematics of Finite Elements and Applications, will take place at Brunel University during 11 - 14 June 2013; an opening early evening lecture will be given by Professor J Tinsley Oden on Monday 10 June to which all delegates will be welcome. Preliminary information is available on the conference website: <http://www.brunel.ac.uk/mafelap2013>.

As usual, the conference will consist of plenary lectures, mini-symposia and parallel sessions. If you are interested in organizing a mini-symposium at MAFELAP 2013 then please email your title to mafelap-mini-symposia@brunel.ac.uk as soon as possible. For those new to the MAFELAP conferences, a flavour of the event is provided by going to <http://people.brunel.ac.uk/~icsrsss/bicom/mafelap2009>.

9 Summer Schools, Courses and Other Events

GPUs for Scientific Computing, taught through case studies 9–10 January 2012, University of Edinburgh

Four hours of tutorials by Mike Giles (Oxford University):

January 9th

14:00-15:00: Tackling a new GPU application

15:30-16:30: Real-time dispersion in astrophysics

January 10th

14:00-15:00: Sparse matrix vector product and finite element assembly

15:30-16:30: OP2, a framework for unstructured grid applications

Sponsored by The Centre for Numerical Algorithms and Intelligent Software (NAIS) and the University of Edinburgh. There are no registration fees, but attendance should be confirmed as per the event website above.

See <http://www.nais.org.uk/Page.php?thePage=GPU2012>

Advances in High Performance Scientific Computing 16 January 2012, School of Mathematics, The University of Manchester

This meeting aims to highlight recent advances at the interface between numerical analysis and high performance computing. Invited speakers are:

- George A Constantinides (Imperial College London)
- Peter Jimack (University of Leeds)
- Simon McIntosh-Smith (University of Bristol)
- Stan Scott (Queens University Belfast)

The meeting is an activity of the EPSRC Network Numerical Algorithms and High Performance Computing (<http://www.mims.manchester.ac.uk/na-hpc>) and is organized by Nick Higham and David Silvester. For details, see <http://www.mims.manchester.ac.uk/events/workshops/AHPSC/index.php>

7th Postgraduate Numerical Analysis Day Friday 30 March 2012, University of Reading

Participating universities: Bath, Brunel, Cardiff, Imperial, Oxford, Reading, UCL, Warwick. The aim of the day is to give postgraduate students a chance to talk to peers in a relaxed environment. For more details, please contact: Stephen Langdon (s.langdon@reading.ac.uk)

Sixth Meeting of the EPSRC Network on Matrix and Operator Pencils, MOPNET Bath, 2–3 April 2012

Registration is now open for the sixth meeting of the EPSRC network on Matrix and Operator Pencils. The following have agreed to speak:

- Charles Johnson (College of William and Mary)
- Patrick Joly (ENSTA ParisTech)
- Karl Meerbergen (KU Leuven)
- Emre Mengi (Koc University)
- Valeria Simoncini (Bologna)

- Christiane Tretter (Bern)
- Dima Vassiliev (UCL)

Registration is free. Full details are at <http://mopnet.cf.ac.uk/meeting6.html>

**Gene Golub SIAM Summer School 2012:
Simulation and Supercomputing in the Geosciences
July 29–August 10, Monterey, California USA**

The third Gene Golub SIAM Summer School, with a focus on computational geosciences, will take place in Monterey from July 29 to August 10, 2012. Natural hazards caused by storm surges, earthquakes, and tsunamis have exposed a large risk to modern societies in recent years. In order to mitigate these hazards, advanced simulation and computational techniques need to be employed for data analysis, early warning and planning purposes. G2S3 2012 will introduce students to cutting-edge simulation techniques for rapid assessment and accurate process studies of geoscientific problems involving a large range of scales.

The summer school will be composed of three main mini-courses:

- Tsunami and Storm-Surge Simulations.
- Numerical Methods for Wave Propagation.
- Supercomputing in the Geosciences: From Multi- to Many-core Platforms.

Applicants selected to participate pay no registration fee. At least partial funding for local accommodations and meal expenses will be available for all participants. Limited travel funds may also be available.

Application deadline: February 1, 2012. For more details on the course and on how to apply, see <http://www.mac.tum.de/g2s3>

10 Software News

CCP Algorithms and Software for Emerging Architectures (ASEArch)

EPSRC has recently awarded funding for a new CCP entitled Algorithms and Software for Emerging Architectures (ASEArch). The Principal Investigator is Anne Trefethen (Oxford), with Co-investigators Gould and Scott (STFC Rutherford Appleton Laboratory), Ashworth and Follows (STFC Daresbury Laboratory), and De Roure and Giles (Oxford).

Advanced computing is an essential tool in addressing scientific problems of national interest, including climate change, nanoscience, the virtual human, new materials, next-generation power sources and astrophysics; as importantly it is equally essential to solve commercial and industrial problems in financial modelling, engineering, and real-time decision systems. In recent years the computer systems that underpin these software applications have changed radically and it is no longer possible to simply run the same application software efficiently on new machines. This CCP will address this challenge by creating new knowledge regarding new hardware and software systems and disseminating to other computational science groups. That dissemination will occur through publications, workshops, in-depth study groups, new algorithms and software kernels.

The CCP is building on, and leveraging, several existing networks and institutes and is well positioned to leverage international efforts too. There is agreed engagement with the application-driven CCPs and a broad range of network collaborators.

The CCP started in November 2011 and is funded through to the end of April 2015.

HSL Update

Since the release of HSL 2011 at the start of February, there have been a number of updates to the library, most importantly:

- **New package:** HSL_MA97: a bit-compatible linear solver for symmetric and Hermitian systems. This solver implements a traditional multifrontal method and uses OpenMP 3.0 for shared memory parallelism. Unlike many other parallel linear solvers, it takes extra care to ensure that the same answer is returned for each run, regardless of the number of threads used.
- **Updated package:** HSL_MA48: sparse linear solver for highly unsymmetric systems. This package has been significantly updated to add support for 64-bit addressing and dynamic memory management.
- **C interfaces:** Ongoing work to add support for C programmers means that the following codes now have C interfaces available:
 - HSL_MA77: Sparse symmetric system: multifrontal out of core.
 - HSL_MA86: Sparse solver for real and complex indefinite matrices using OpenMP.
 - HSL_MA87: Sparse Cholesky solver for real/complex matrices using OpenMP.
 - HSL_MA97: Bit-compatible parallel sparse symmetric/Hermitian solver using OpenMP.
 - HSL_MC68: Symmetric sparse matrix: compute elimination orderings.
 - HSL_MC69: Matrix format converter.
 - HSL_MI20: Unsymmetric system: algebraic multigrid preconditioner
- **MATLAB interfaces:** The MATLAB interface beta tests have now concluded, and MATLAB interfaces are now officially part of HSL. At present the following packages have MATLAB interfaces available:
 - MA57: Sparse symmetric system: multifrontal method.
 - HSL_MA77: Sparse symmetric system: multifrontal out of core.
 - HSL_MA86: Sparse solver for real/complex indefinite matrices using OpenMP.
 - HSL_MA87: Sparse Cholesky solver for real/complex matrices using OpenMP.
 - HSL_MA97: Bit-compatible parallel sparse symmetric/Hermitian solver using OpenMP.
 - HSL_MC64: Permute and scale a sparse unsymmetric or rectangular matrix to put large entries on the diagonal.
 - HSL_MC73: Sparse symmetric matrix: compute Fiedler vector and permute to reduce the profile and wavefront.
 - ME57: Sparse Hermitian or complex symmetric: multifrontal method.
 - HSL_MI20: Unsymmetric system: algebraic multigrid preconditioner

Further information and free downloads for academics are available from <http://www.hsl.rl.ac.uk>.

The HSL Mathematical Software Library is developed and maintained by the STFC's Numerical Analysis Group based at the Rutherford Appleton Laboratory, and current work is substantially funded by EPSRC grant EP/I013067/1.

Jonathan Hogg, HSL Manager (hsl@stfc.ac.uk)

News from NAG

A.G.Ms are not normally described as ‘exciting’ but this year NAG’s Annual General Meeting excelled in this capacity with a mathematical talk from Peter Jimack, a fascinating recount of the early development of NAG from Brian Ford, a stimulating discussion on the payment of board members, the presentation of a life award to Steve Hague and a very close election to the NAG board.

Professor Peter Jimack, from the University of Leeds, is a newly co-opted member to the NAG board and his presentation introduced his academic work to the NAG membership. He discussed the solution of a system of highly nonlinear parabolic PDEs, for the simulation of the solidification a non-isothermal binary alloy. The challenges of this model included the need to resolve a moving feature (the solid-liquid interface) at very small length scales, the existence of vastly different time scales (leading to severe stiffness) and the desire for simulations to be in three space dimensions. In order to develop efficient and reliable simulation software he needed to incorporate mesh adaptivity (for locally enhanced spatial resolution), an implicit stiff integrator in time, and to use multi-grid methods to solve the resulting nonlinear algebraic system of equations at each time step. Extensions to three space dimensions required the use of parallel implementations on the high performance computing (HPC) facility at Leeds. His talk therefore satisfied the technical appetite of numerical mathematicians and of software engineers.

Brian’s talk described in graphic detail the trials and tribulations of the first few years of NAG, illustrated by various ‘props’, such as a magnetic tape and punched card used at that time. He described the enthusiasm of developers and users and the long hours spent in the machine rooms forming a library. He recounted the trip from Nottingham to Oxford to use the facilities there and how the local fish and chip shop provided valuable nourishment as darkness fell. He spoke about the naming scheme adopted by NAG for its routines - the modified SHARE classification scheme by which NAG routines are still instantly recognised. Apparently the vote on this was very close; only vote decided the issue over a mnemonic naming scheme. However Brian felt that the decision had been correct. Of course now the Fortran language has removed a restriction of 6 characters for a subroutine name and so our new Mark 23 Fortran library offers a choice of the familiar short name and a more descriptive long name. For example users can call E04NXF or `nagf_opt_qpconvex2_sparse_option_integer_get` to use the same routine.

The business part of the A.G.M. led to a discussion on the payment of board members. The chairman outlined the proposals and gained support from David Hartley who preferred to use the term ‘honorarium’ for such payments. Other members were less enthusiastic about the idea.

The election to the board was contested by two candidates: Bill Burke who had served as a co-opted member and John Reid, who had been a member of NAG for many years and had contributed to the library development throughout. The contrast in CVs was marked; Bill being on the commercial side and John on the technical. In the event the number of votes counted resulted in a tie, a perfect balance between commercial and technical, but not perhaps the outcome the NAG chairman would have wanted!

Finally, I must end by congratulating my friend and colleague, Malcolm Cohen, for winning this year’s 1906 Award from the International Electrotechnical Commission. The 1906 Award commemorates the IEC’s year of foundation and honours IEC experts from around the world whose work is fundamental to the IEC. Malcolm gained this honour for his work as Editor of the Fortran standard. He is, of course, a co-author of the book ‘Modern Fortran Explained’, by Michael Metcalf, John Reid and Malcolm Cohen and is the driving force behind NAGs own Fortran compiler.

David Sayers (David.Sayers@nag.co.uk)

11 PhD Theses

Ray Millward (Bath). A new adaptive multiscale finite element method with applications to high contrast interface problems

Fynn Scheben (Bath). Iterative Methods for Criticality Computations in Neutron Transport Theory.

Maha Al-Ammari (Manchester). Analysis of Structured Polynomial Eigenvalue Problems.

Elena Meneguz (Newcastle). Measurements of the statistical properties of particle segregation in turbulent flows.

(Elena will be joining the Met. Office in January 2012).

12 Recent appointments

University of Bath

Paul Milewski (Professor of Mathematics) joined us from the University of Wisconsin, Madison. His research interests are Applied Mathematics, Geophysical Fluid Mechanics, Nonlinear Waves, Free-surface Problems and Mathematical Biology.

Elisabeth Ullmann (PostDoc) joined us from the University of Freiberg, Germany. Her research interests are Finite element methods, partial differential equations, Uncertainty quantification, Krylov subspace methods, multigrid methods and Preconditioning.

Eike Mueller (PostDoc) has joined us from the MetOffice. He is working on Parallel programming and optimisation, MPI and OpenMP, Monte Carlo methods, Dispersion for emergency response applications and multigrid methods.

University of Cardiff

Angela Mihai has been appointed as a Lecturer in Applied Mathematics at the Cardiff School of Mathematics, Cardiff University. Previously, she was a postdoctoral researcher on the research programme New Frontiers in the Mathematics of Solids led by Professor Sir John Ball, at the Mathematical Institute, University of Oxford. She holds a BSc in Mathematics from the University of Bucharest, Romania, a Certificate of Advanced Study in Mathematics from the University of Cambridge, and a DPhil in Numerical Analysis from Durham University (supervisor: Dr. Alan Craig).

Her research is in the area of applied and computational mathematics at the interface with physical sciences and engineering disciplines. In particular, her research focus is on the rigorous mathematical modelling and numerical analysis of damage in structural and solid mechanics, including multiscale modelling, limit states analysis, and computational simulation for applications.

University of Durham

The Numerical Analysis Group in Durham has recently appointed two lecturers:

Patrick Dondl: Patrick received his PhD from the California Institute of Technology in June 2007. He then worked as a post doc at the Max-Planck-Institute for Mathematics in the Sciences in Leipzig and at the University of Bonn. His research interests are in the fields of calculus of variations and partial differential equations, in particular concerning pattern formation in non-convex energy landscapes and the combination of analysis and stochastics to model systems with random input.

Anthony Yeates: Anthony received his PhD from the University of St Andrews in June 2009 for a thesis on numerical modelling of the Sun's global magnetic field. After submitting the thesis in 2008 he held postdoctoral positions firstly at Harvard-Smithsonian Center for Astrophysics in the US, and then with the magnetohydrodynamics research group at the University of Dundee.

University of Manchester

Yuji Nakatsukasa: (postdoctoral research associate) joined the School of Mathematics from the University of California, Davis. He is working with Françoise Tisseur on nonlinear eigenvalue problems and his research interests also include eigenvalue perturbation theory and algorithms for the SVD and the symmetric eigenvalue decomposition.

13 Vacant positions and studentships

Cambridge University

Cambridge Centre for Analysis (<http://www.maths.cam.ac.uk/postgrad/ccca/>), an EPSRC-funded Centre for Doctoral Training, focussing on pure, applied, stochastic and computational analysis, is recruiting students for the 2012 cohort, the deadline for applications is 15 January 2012. We welcome first-class applicants and a numerical analysis background is a definite plus.

Oxford University

The Numerical Analysis Group at the University of Oxford is hoping to recruit two University Lecturers in 2012 and 2013. Further details for the UL Numerical Mathematics in association with Exeter College in can be found at <http://www.maths.ox.ac.uk/node/17100> Further details for the possible second post will be announced when available.

In addition, I will shortly be advertising both a postdoctoral research assistantship and also a DPhil studentship connected with the Chebfun project (<http://www2.maths.ox.ac.uk/chebfun/>). Feel free to contact me with any questions.

Nick Trefethen (trefethen@maths.ox.ac.uk)

14 Postgraduate Courses

Please see the last Newsletter for details of MSc additional courses.

University of Manchester

The School of Mathematics at the University of Manchester offers three one-year taught Master postgraduate training programmes in applied mathematics:

- MSc in Applied Mathematics
- MSc in Applied Mathematics with Industrial Modelling
- MSc in Applied Mathematics with Numerical Analysis

For details see <http://www.maths.manchester.ac.uk/postgraduate/pgadmission/applied.html>

15 IMA Journal of Numerical Analysis

Contents of Volume 31, Number 4 (see <http://imajna.oxfordjournals.org/>)

- 1253 V. Domnguez, I. G. Graham, and V. P. Smyshlyaev.
Stability and error estimates for FilonClenshawCurtis rules for highly oscillatory integrals.
- 1281 Shuhuang Xiang, Yeol Je Cho, Haiyong Wang, and Hermann Brunner.
ClenshawCurtisFilon-type methods for highly oscillatory Bessel transforms and applications
- 1315 Stig Larsson and Ali Mesforush.
Finite-element approximation of the linearized CahnHilliardCook equation.
- 1334 Andrea Bressan.
Isogeometric regular discretization for the Stokes problem.
- 1357 Beirao da Veiga, Jerome Droniou, and Gianmarco Manzini.
A unified approach for handling convection terms in finite volumes and mimetic discretization methods for elliptic problems.
- 1402 Javier de Frutos, Bosco Garcia-Archilla, and Julia Novo.
Nonlinear convectiondiffusion problems: fully discrete approximations and a posteriori error estimates.
- 1431 Silvia Bonettini.
Inexact block coordinate descent methods with application to non-negative matrix factorization.
- 1453 Tiexiang Li, Eric King-Wah Chu, Jong Juang, and Wen-Wei Lin.
Solution of a nonsymmetric algebraic Riccati equation from a one-dimensional multistate transport model.
- 1468 John R. Singler.
Convergent snapshot algorithms for infinite-dimensional Lyapunov equations.

- 1497 Melvin Leok and Jingjing Zhang.
Discrete Hamiltonian variational integrators.
- 1533 Jan Cermak.
The stability and asymptotic properties of the θ -methods for the pantograph equation.
- 1552 Siu A. Chin and Jurgen Geiser.
Multi-product operator splitting as a general method of solving autonomous and nonautonomous equations.
- 1578 Rodrigo B. Platte.
How fast do radial basis function interpolants of analytic functions converge?
- 1598 Jinhai Chen and Matthias Gerdtts.
Numerical solution of control-state constrained optimal control problems with an inexact smoothing Newton method.
- 1625 Qingna Li and Dong-Hui Li.
A class of derivative-free methods for large-scale nonlinear monotone equations.
- 1636 Anahi Dello Russo and Ana Alonso.
Hybrid finite element analysis of fluid-structure systems with coupling on curved interfaces.
- 1683 Ariel L. Lombardi.
Interpolation error estimates for edge elements on anisotropic meshes.
- 1713 Stephane Durand and Maran Slodicka.
Fully discrete finite element method for Maxwells equations with nonlinear conductivity.
- 1734 Thirupathi Gudi and Michael Neilan. An interior penalty method for a sixth-order elliptic equation.
- 1754 Fei Wang, Weimin Han, and Xiaoliang Cheng.
Discontinuous Galerkin methods for solving the Signorini problem.

16 Acknowledgements

I would like to thank the following people for contributing to this issue of the Newsletter.

Pamela Bye (IMA)
 Coralia Cartis (Edinburgh)
 Sue Davis (Reading)
 Iain Duff (RAL)
 Lotti Ekert (Oxford)
 Melina Freitag (Bath)
 Nick Higham (Manchester)
 Jonathan Hogg (RAL)
 Arieh Iserles (Cambridge)
 Max Jensen (Durham)
 Tim Phillips (Cardiff)
 David Sayers (NAG)
 Carolyn Sellers (Brunel)
 David Swailes (Newcastle)
 Nick Trefethen (Oxford)