

**THE INSTITUTE OF MATHEMATICS AND ITS
APPLICATIONS**

IMANA NEWSLETTER

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

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1 Introduction

In this issue of the Newsletter, we continue our series of articles that aim to introduce the members, interests and activities of NA groups in the UK, this time focusing on Birmingham (with thanks to Daniel Loghin). We also have a varied selection of highlighted conferences taking place over the summer. One in particular will be of interest to many numerical analysts of all generations and that is the one-day meeting to be held in Oxford on Saturday 29 May to celebrate Bill Morton's 80th birthday (see Section 7).

Important news from the Department of Mathematics at Bath is that the Department is moving to a new building over Easter. Most of the Numerical Analysis staff and students will be based in 4W; a few people will stay in 1W.

The copy date for the next Newsletter will be **Friday 24th September**. Contributions from individuals as well as groups/departments are very welcome.

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2 Meet the Numerical Analysis Group ... Birmingham

Several new appointments over the last five years have meant that the School of Mathematics at the University of Birmingham can now boast a large Optimisation group complete with Numerical Analysis as well as Computational Biology researchers. A brief description of research activities is included below and further information can be found at <http://www.mat.bham.ac.uk/research/>.

Peter Butkovic works on topics in max-algebra and its applications to the control of industrial processes. Max-algebra is a theory between linear algebra and combinatorial optimisation. One of its key features is the possibility of solving a class of non-linear problems in a linear-like way. Some of the results have been used in the modelling of multi-machine interactive production processes. Attention has also been paid to the max-algebraic discrete-event dynamic systems theory where results of fundamental importance have been achieved. Dr Butkovic has been awarded three EPSRC grants in support of this research and an LMS grant to organise an international workshop on max-algebra.

Tomas Johansson's main research interest is in the stable reconstruction of physical quantities from models which are highly sensitive to measurement noise, so-called ill-posed problems. Models include the flow and temperature determination from incomplete boundary data (Stationary Stokes system and heat equation) and shape reconstruction in acoustics (Helmholtz equation).

Michal Kocvara's research focuses on algorithms for large-scale nonlinear and semidefinite optimisation. Particular interest is given to linear and nonlinear semidefinite programming problems, and problems with special data structures. Professor Kocvara is a co-author of PENNON, the first package that can solve optimisation problems with a combination of standard non-linear and matrix inequality constraints. Other areas of interest include optimisation of elastic structures, in particular, free material design and optimisation with equilibrium constraints.

Daniel Loghin's main research interest is in numerical linear algebra and, in particular, solution techniques for large sparse linear and non-linear systems of equations. The applications under consideration arise from a range of different areas such as modeling of Newtonian and non-Newtonian flow, interior point methods, financial mathematics, ocean models etc. Some of the main techniques considered are preconditioned Krylov methods and domain decomposition methods for linear problems and continuation methods for nonlinear systems.

Roy Mathias has considered a wide range of topics in matrix analysis: matrix perturbation theory, functions of matrices (theory and computation), matrix inequalities and numerical linear algebra. In the latter category, a notable contribution is the multishift QR algorithm outlined in a couple of papers which were awarded the SIAM Linear Algebra Activity Group prize for the best paper 2000-2002.

Sandor Nemeth has worked for some time in the area of equilibrium systems. A main topic is complementarity theory with emphasis on existence of solutions, multiplicity and numerical

approximation. For linear complementarity problems, Dr Nemeth and Prof G Isac established a relation between solvability and the decomposition of a matrix into a product of two matrices. Recently, Prof Isac and Dr Nemeth obtained some existence theorems for nonlinear complementarity problems by using the notions of exceptional family of elements and of scalar derivative.

Natalia Petrovskaya is interested in numerical techniques for grid adaption and error indicators for vector functions as well as robust discretisation on unstructured grids. Of particular interest is grid adaption in boundary layers. Other topics of research include high order discontinuous Galerkin schemes for hyperbolic systems of conservation laws.

Jan Ruckmann works in parametric semi-infinite programming. Generalized and standard semi-infinite programming became in recent years a substantial research area in mathematical programming. There exists a wide range of applications, e.g., environmental problems, design centering problems, robotics, wavelets, portfolio optimisation, (reverse) approximation problems, robust optimisation, time minimal control problems and others. In many applications the semi-infinite model depends on parameters where different model solutions exist when the values of the parameters are varying. Dr Ruckmann's focus is on the analysis of corresponding stability and sensitivity properties.

Yunbin Zhao's research covers theoretical and computational optimisation, matrix analysis and applications, and numerical algorithms and computational complexity. More specifically, his research covers theory, algorithms and applications of linear and nonlinear programming, convex analysis, finite-dimensional variational inequality/complementarity problems, global optimisation, robust optimisation, and approximation methods, quadratic forms, and combinatorial optimisation.

Daniel Loghin (d.loghin@bham.ac.uk)

3 Who's Visiting Whom

Chester

Eugene Tyrtshnikov, Institute of Numerical Mathematics, Russian Academy of Sciences, Moscow, Leverhulme International Professor, 1 June - 31 July 2010.

Research interests: Numerical linear algebra, model reduction, integral equations.

Host: Neville Ford (njford@chester.ac.uk).

Liverpool

Dr Y Q Dong (University of Graz, Austria), 2-17 April 2010.

Research interests: Variational imaging models. Contact: K Chen (K.Chen@liverpool.ac.uk)

Dr C Brito (Autonomous University of Yucatan, Mexico), 15 June-14 July 2010.

Research interests: High order imaging models. Contact: K Chen (K.Chen@liverpool.ac.uk)

Manchester

Yangfeng Su, School of Mathematical Sciences, Fudan University. March - April 2010.

Research interests: Matrix eigenvalue problems and model order reduction.

Host: Françoise Tisseur (F.Tisseur@manchester.ac.uk).

Oxford

Dr Pedro Gonnet, ETH Zurich, 1 October 2009 - 30 September 2010.

Host: Nick Trefethen (Nick.Trefethen@maths.ox.ac.uk).

Professor Gil Strang will visit for about 4 weeks during May/June (dates to be confirmed).

Dr Faisal Fairag will visit from 1 July to 31 August 2010. He will work with Andy Wathen and be partly based at OCCAM and partly at the Numerical Analysis Group.

Rutherford Appleton Laboratory

Dr Dominique Orban, Ecole Polytechnique de Montreal, Quebec, Canada, January - May 2010.

Research interests: primal-dual interior point and barrier methods for nonlinear programming.

Host: Nick Gould (Nick.Gould@stfc.ac.uk).

4 Technical Reports

University of Bath

BICS reports: Available from <http://www.bath.ac.uk/math-sci/bics/preprints/>

- 3/10 Numerical estimation of coercivity constants for boundary integral operators in acoustic scattering.
T. Betcke and E. A. Spence.
- 2/10 Stability and error estimates for Filon-Clenshaw-Curtis rules for highly-oscillatory integrals.
V. Domnguez, I.G. Graham and V.P. Smyshlyaev.
- 1/10 Resolution of sharp fronts in the presence of model error in variational data assimilation.
M. A. Freitag, N. K. Nichols, C. J. Budd.

Brunel University

Reports available from http://people.brunel.ac.uk/~icsrsss/bicom/tech_rep.html

University of Cambridge

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

- NA2010/03 A. Boettcher, H. Brunner, A. Iserles and S. P. Norsett.
On the Singular Values and Eigenvalues of the Fox-Li and Related Operators.
- NA2010/02 B. Adcock, A. Iserles and S. P. Norsett.
From high oscillation to rapid approximation II: Expansions in Birkhoff series.
- NA2010/01 Arieh Iserles.
A fast (and simple) algorithm for the computation of Legendre coefficients.

University of Edinburgh

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

- ERGO 10-001 E. Fragniere, J. Gondzio, N.S. Tuchschnid and Q. Zhang.
Non-parametric liquidity adjusted VaR model: a stochastic programming approach.
- ERGO 10-002 P.Gonzalez-Brevis, J. Gondzio, Y. Fan, H.V. Poor, J. Thompson, I. Krikidis and P.-J. Chung.
Base station location optimization for minimal energy consumption in wireless networks.
- ERGO 10-003 A. Grothey and X. Yang.
Solving the top-percentile traffic routing problem by approximate dynamic programming.

University of Liverpool

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

- NA10/02 A multilevel algorithm for simultaneously denoising and deblurring images.
Raymond H Chan and Ke Chen.
- NA10/03 On high order denoising models and fast algorithms for vector-valued images.
Carlos Brito and Ke Chen.

University of Manchester

MIMS EPrints from <http://www.manchester.ac.uk/mims/eprints> Preprints with AMS Mathematics Subject Classification 65: Numerical Analysis.

- 2010.30: Awad H. Al-Mohy and Nicholas J. Higham.
Computing the Action of the Matrix Exponential, with an Application to Exponential Integrators.
- 2010.19: Andrew D. Gordon and Catherine E. Powell.
Solving Stochastic Collocation Systems with Algebraic Multigrid.
- 2010.18: Nicholas J. Higham and Awad H. Al-Mohy.
Computing Matrix Functions.
- 2010.11: Younes Chahlaoui.
Two efficient SVD/Krylov algorithms for model order reduction of large scale systems.

University of Oxford

Reports available from <http://web.comlab.ox.ac.uk/oucl/publications/natr/index.html>

- NA-09/09 Sheehan Olver.
Numerical solution of Riemann-Hilbert problems: Painleve II.
- NA-10/01 Benedikt Wirth, Ian Sobey, Almut Eisentraeger.
A note on the solution of a poroelastic problem.

University of Reading

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

- MPS_2010_01 S.N. Chandler-Wilde, S. Langdon and M. Mokgolele.
A high frequency boundary element method for scattering by convex polygons with impedance boundary conditions.
- MPS_2010_02 Peter Grindrod and Mark Parsons.
Social Networks: Evolving Graphs with Memory Dependent Edges.
- MPS_2010_03 A.S. Fokas and B. Pelloni.
Boundary value problems for the elliptic sine-Gordon equation in a semi-strip.
- MPS_2010_04 M.A. Freitag, N.K. Nichols and C.J. Budd.
Resolution of sharp fronts in the presence of model error in variational data assimilation.

Rutherford Appleton Laboratory

Reports available from <http://www.numerical.rl.ac.uk/reports/reports.shtml>

- RAL-TR-2010-001 J. A. Scott.
Numerical Analysis Group Progress Report: January 2008 - December 2009.
- RAL-TR-2010-004 J. A. Scott and M. Tuma.
The importance of structure in algebraic preconditioners.

University of Strathclyde

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

5 Diary of Seminars (April - June 2010)

BATH Numerical Analysis Seminars: Seminars take place on Fridays at 12:15pm in Department of Mathematical Sciences, Building 1 West, Room 1W3.6. The timetable is available at <http://people.bath.ac.uk/cn229/naseminars/>

BATH BICS series: Seminars take place at 1:15pm in Department of Mathematical Sciences, Building 1 West, Room 4W 1.7. A timetable is available at <http://www.bath.ac.uk/math-sci/bics/seminars/>

BATH CNM Seminars: Seminars take place on Tuesdays at 1:15pm in the Department of Mathematical Sciences, Building 1 West, Room 4W 1.7. The timetable is available at <http://www.bath.ac.uk/cnm/> (and should be checked to confirm location).

BATH Numerical Analysis series: Seminars take place on Fridays at 12:15pm. The location of those seminars for April will be available just after Easter. For information and a timetable, see <http://www.maths.bath.ac.uk/~mamamf/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/mathsevents>

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

CAMBRIDGE : There are three relevant seminar series in Cambridge which are held in MR14, Pavilion F, Centre for Mathematical Sciences: Applied and Computational Analysis Seminars (<http://talks.cam.ac.uk/show/index/9811>), Numerical Analysis Seminars (<http://www.damtp.cam.ac.uk/user/na/seminars.html>), and ACA Graduate Seminars (<http://talks.cam.ac.uk/show/index/15177>).

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/mathsevents/Applied/Research/Seminars/index.html>

MANCHESTER : Numerical Analysis and Scientific Computing Seminars are held 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 NA Group Seminar Room, 3 Worcester Street. 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 held in the Atlas Centre, Rutherford Appleton Laboratory and start at 2pm. Contact: sue.thorne@stfc.ac.uk

READING : Seminars take place on Fridays promptly at 3pm 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. Timetable 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.

APRIL 2010

- APRIL 12 : BATH (BICS). Claudia Wulff (Surrey). Symplectic time-semidiscretizations of semilinear Hamiltonian PDEs.
- APRIL 13 : BATH (CMS). Daphne Klotsa (Bath). Structure formations of spheres in oscillatory fluid flows.
- APRIL 16 : BATH. Ben Adcock (Cambridge). Title TBA.
- APRIL 20 : BATH (CMS). Valerio Lucarini (Reading). Stochastic Resonance in the Thermohaline Circulation.
- APRIL 22 : CAMBRIDGE. Natalia Janson (Loughborough). Noise-induced phenomena in nonlinear systems and their control.
- APRIL 22 : OXFORD. Martin van Gijzen (Delft University of Technology). Spectral analysis of the discrete Helmholtz operator preconditioned with a shifted Laplacian.
- APRIL 23 : BATH. Gabriel Barrenechea (Strathclyde). Title TBA.
- APRIL 27 : BATH (CMS). Ross Bannister (Reading). Regularization in large data assimilation problems.
- APRIL 29 : RAL. Dominique Orban (Ecole Polytechnique de Montreal). Title TBA.
- APRIL 30 : BATH. Adrian Hill (Bath). Recent work of Michel Crouzeix in removing the eigenvector condition number from norm estimates of matrix functions.

MAY 2010

- MAY 4 : BATH (CMS). Alain Nogaret (Bath). Stochastic dynamics of neuron-like structures.
- MAY 5 : EDINBURGH. Dominique Orban (Ecole Polytechnique de Montreal). Title TBA.
- MAY 5 : LIVERPOOL. Choi-Hong Lai (Greenwich). On transformation methods and their induced parallel properties in temporal domain computation.
- MAY 6 : CAMBRIDGE. Gino Biondini (State University of New York at Buffalo). Soliton solutions of discrete and continuous (2+1)-dimensional integrable systems: resonance, web structure and combinatorial algebraic geometry.
- MAY 6 : OXFORD. Roland Herzog (Chemnitz University of Technology). A Preconditioned conjugate gradient method for optimal control problems with control and state constraints.
- MAY 7 : BATH. Bodo Werner (Hamburg). Bifurcations in microscopic car following models with bottle necks.
- MAY 10 : BATH (BICS). Fritz Busse (Bayreuth). What can thermal convection teach us about the nature of turbulence?
- MAY 11 : BATH (CMS). Rosamund Sutherland (Bristol). Mathematics and mathematics education.
- MAY 18 : BATH (CMS). Mike R Jeffrey (Bristol). Hunting ducks and nondeterminism in nonsmooth dynamics.

MAY 10 : BATH (BICS). Thomas Fischbacher (Southampton). Mesoscopic models of magnetic systems and their simulation

MAY 17 : BATH. Helmut Podhaisky (Martin-Luther-Universitat Halle-Wittenberg). Computing B-series for Runge-Kutta methods.

MAY 20 : RAL. Jan Van Lent (University of the West of England Bristol). Title TBA.

MAY 25 : BATH (CMS). Thomas Stemler (University of Western Australi).a The quest for a shady place (using shadowing filters for forecasting and tracking of non-linear systems).

MAY 27 : CAMBRIDGE. Aslan Asimov (KAUST). Forced hyperbolic systems and self-sustained shock waves.

MAY 27 : OXFORD. Mahadevan Ganesh (Colorado School of Mines, USA). High-order surface integral algorithms for 3D computational electromagnetics.

JUNE 2010

JUNE 1 : BATH (CMS). Roger Bayford (Middlesex). Electrical Impedance Tomography.

JUNE 1 : EDINBURGH. Ted Ralphs (Lehigh University, USA).

JUNE 3 : OXFORD. Garth Wells (Cambridge). Title TBA.

JUNE 17 : OXFORD. Joseph Ward (Texas A&M University). Title TBA.

JUNE 24 : CAMBRIDGE. Mahadevan Ganesh (Colorado School of Mines, USA). TBC.
A pseudospectral method for surface NavierStokes equations.

6 Forthcoming Meetings and Conferences

APRIL 2010

ICFD Numerical Methods for Fluid Dynamics, April 12-15.

Reading, UK. <http://www.icfd.reading.ac.uk/ICFD2010>

European Workshop on Mixed Integer Nonlinear Programming, April 12-16.

Marseilles, France. <http://sites.google.com/site/ewminlp/>

Women in Mathematics, April 15-16.

Isaac Newton Institute, Cambridge. <http://www.newton.ac.uk/women/WIM>

Third International Workshop on Parallel and Distributed Computing in Finance, April 23.

Atlanta, USA. <http://www.cs.umanitoba.ca/~pdcof>

MAY 2010

INDAM Numerical Methods for Stochastic Partial Differential Equations, May 10-13.

Politecnico di Torino, Italy. <http://calvino.polito.it/~numerica/>

European Finite Element Fair (EFEF), May 20-21.

University of Warwick.

<http://www2.warwick.ac.uk/fac/sci/math/research/events/2009-2010/workshops/efef10/>

Applied Linear Algebra - in honor of Hans Schneider, May 24-28.

Novi Sad, Serbia. <http://www.dmi.uns.ac.rs/events/ala2010>

15th International Conference Mathematical Modelling and Analysis (MMA2010), May 26-29.

Druskininkai, Lithuania. <http://www.vgtu.lt/mma/mma2010/>

Tenth International Conference on Computational Science (ICSS 2010), May 31 - June 2.
Amsterdam, The Netherlands. <http://www.iccs-meeting.org/iccs2010>

International Conference on Advances in Partial Differential Equations and Their Applications, May 31 - June 4.

Fudan University, Shanghai, China.

http://math.fudan.edu.cn/science/Conference/2010_Temam_Conference/index.htm

Third Conference on Computational and Mathematical Population Dynamics (CMPD3), May 31 - June 4.

Bordeaux, France. <http://www.sm.u-bordeaux2.fr/CMPD3/>

JUNE 2010

Seventh Panamerican Workshop in Applied and Computational Mathematics, June 6-11.

Choroni, Venezuela. <http://www.csrc.sdsu.edu/csrc/panam/index.php>

PARA 2010, June 6-9.

Reykjavik, Iceland. <http://vefir.hi.is/para10>

Structural Dynamical Systems, June 8-11.

Capitolo-Monopoli, Bari, Italy. <http://www.dm.uniba.it/delbuono/sds10/sds10.htm>

Seventh International Conference on Scientific Computing and Applications (ICSCA'10) , June 13-16.

Dalian, P. R. China. <http://www.icsca2010.org/>

Sparse Days at CERFACS, June 15-17.

Toulouse, France. <http://www.cerfacs.fr/algor/SparseDays2010/index.html>

Adaptive Finite Elements and Domain Decomposition Methods, June 17-19.

Milan, Ital. www.mat.unimi.it/milano2010

BIT 50th Anniversary Conference, June 17-20.

Lund, Sweden. <http://www.csc.kth.se/BIT/>

16th Conference of the International Linear Algebra Society (ILAS), June 21-25.

Pisa, Italy. <http://www.dm.unipi.it/~ilas2010>

Computational Methods in Applied Mathematics, June 20-26.

Bedlewo, Poland. <http://www.impan.pl/~cmam-4/>,

9th International Meeting on High Performance Computing for Computational Science (VECPAR 2010), June 22-25.

Lawrence Berkeley National Laboratory, CA. <http://vecpar.fe.up.pt/2010/>

10th Conference on Computational and Mathematical Methods in Science and Engineering, June 26-30.

Almeria, Andalucia, Spain. <http://www.math.wisc.edu/cmmse/index.html> .

International Workshop on Accurate Solution of Eigenvalue Problems VIII (IWASEP VIII), June 28 - July 1.

Berlin. <http://www3.math.tu-berlin.de/iwasep8/>

6th International Workshop on Parallel Matrix Algorithms and Applications (PMAA), June 30 - July 2.

Basel, Switzerland. <http://www.pmaa10.unibas.ch/>

Multiscale Molecular Modelling 2010,
June 30 - July 3.
 Edinburgh. <http://www.nais.org.uk/mmm2010>

JULY 2010

Boundary and Interior Layers (BAIL 2010), July 5 - 9.
 University of Zaragoza, Spain. <http://www.bail2010.unizar.es/>

International Congress on Computational and Applied Mathematics, July 5-9.
 University of Leuven, Belgium. <http://www.iccam.ugent.be/>

Uncertainty in Computer Models 2010, July 12 - 14.
 Sheffield. <http://mucm.group.shef.ac.uk/UCM2010.html>

11th International Conference on Integral Methods in Science and Engineering,
July 12 - 15.
 Brighton. <http://www.cmis.brighton.ac.uk/imse2010/index.php>

EUROPT Workshop on Advances in continuous optimization, July 12 - 16.
 Aveiro, Portugal. <http://www.europt2010.com>

2010 SIAM Annual Meeting (AN10), July 12 - 16.
 The David L. Lawrence Convention Center, Pittsburgh, Pennsylvania. <http://www.siam.org/meetings>

Numerical Linear Algebra: Perturbation, Performance, and Portability - A conference in honor of G.W. (Pete) Stewart, July 19 - 20.
 University of Texas at Austin, USA. <http://z.cs.utexas.edu/wiki/stewart2010.wiki/>

Second Latin-American Workshop on Optimization and Control (LAWOC 2010),
July 20 -22.
 Rosario, Argentina. <http://www.fceia.unr.edu.ar/lawoc>

12th LMS/EPSRC Summer School in Computational Mathematics and Scientific Computing, July 25 - 31.
 Durham. <http://maths.dur.ac.uk/nass/>

European Conference on Mathematics for Industry (ECMI), July 26 - 30.
 Wuppertal, Germany. <http://www.ecmi2010.eu>

AUGUST 2010

IEEE 9th International Symposium on Distributed Computing and Applications to Business, Engineering and Science (DCABES 2010), August 10 - 12.
 Lingnan University, Hong Kong. <http://dcabes.meeting.whut.edu.cn/DCABES2010/>

Seventh International Conference on Numerical Methods and Applications, August 20 - 24.
 Borovets, Bulgaria. <http://www.math.bas.bg/~nummeth/nma10>

Modeling and Optimization: Theory and Applications (MOPTA 2010), August 18 - 20.
 Lehigh University, Bethlehem, Pennsylvania. <http://coral.ie.lehigh.edu/~mopta/>

Summerschool: Sparse Tensor Discretizations of High-Dimensional Problems,
August 23 - 27.
 ETH Zurich, Switzerland. <http://www.sam.math.ethz.ch/zss2010/>

Unstructured Meshes in Dynamical Spacetimes, August 25 - 27.
 Jena, Germany. <http://cse.mathe.uni-jena.de/wumds/>

16th International European Conference on Parallel and Distributed Computing - Euro-Par 2010, August 31 - September 3.

Ischia, Italy. <http://www.europar2010.it>

Leverhulme International Network Meeting on Numerical and Analytical Solution of Stochastic Delay Equations, August 31 - September 3.

University of Chester <http://www.stochasticdelay.org.uk>

SEPTEMBER 2010

Joint European Science Foundation European Mathematical Society conference on highly oscillatory problems, September 12 - 17.

Isaac Newton Institute for Mathematical Sciences in Cambridge. <http://www.esf.org/index.php?id=6532>

17th European MPI Users' Group Meeting (EuroMPI 2010), September 12 - 15.

Stuttgart, Germany. <http://www.eurompi2010.org>

Second IMA Conference on Numerical Linear Algebra and Optimisation, September 13 - 15.

University of Birmingham. http://www.ima.org.uk/Conferences/2nd_numerical_linear_algebra.html

Conference in Numerical Analysis (NumAn 2010) - Recent Approaches to Numerical Analysis: Theory, Methods and Applications, September 15 - 18.

Chania, Greece. <http://numan2010.science.tuc.gr>

6th International Workshop on the Numerical Solution of Markov Chains (NSMC 2010), September 16 - 17.

Williamsburg, VA, USA. <http://www.cs.bilkent.edu.tr/nsmc10/>

European Multigrid Conference EMG 2010, September 19 - 23.

Isola d'Ischia (Napoli), Italy. <http://www.emg2010.unisannio.it/>

International Conference on Numerical Analysis and Applied Mathematics, September 19 - 25.

Rhodes, Greece. <http://www.icnaam.org/>

Numerical Analysis of Stochastic PDEs (NASPDE 2010), September 20 - 21.

TU Bergakademie Freiberg, Germany. <http://www.math.tu-freiberg.de/naspde2010>

10th International Conference on Parametric Optimization, September 20 - 24.

Karlsruhe, Germany. <http://www.ior.kit.edu/paraoptX.php>

14th GAMM - IMACS International Symposium on Scientific Computing, Computer Arithmetic and Validated Numerics, September 27 - 30.

Lyon, France. WEB SITE: <http://scan2010.ens-lyon.fr/>

OCTOBER 2010

Summer School on Applied Analysis, October 4 -8.

Chemnitz, Germany. <http://www.tu-chemnitz.de/~potts/cms/>

MAY 2011

Preconditioning 2011, May 16 - 18.

Bordeaux, France. Contact: pascal.henon@labri.fr

JUNE 2011

Householder Symposium XVIII, June 12 - 17.

Tahoe City, California. <http://crd.lbl.gov/SCG/HH11/>

JULY 2011**Foundations of Computational Mathematics, July 4 - 14.**Budapest. <http://www.damtp.cam.ac.uk/user/na/FoCM11/>**ICIAM 2011, July 18 - 22.**Vancouver, BC, Canada. <http://www.iciam2011.com/>**AUGUST 2011****ILAS Conference Pure and Applied Linear Algebra: The New Generation, August 22 - 26.**Braunschweig, Germany. <http://www.ilas2011.de>**7 Highlighted Conferences and Workshops**

Energy Systems Week
Isaac Newton Institute, 24-27 May 2010

The Isaac Newton Institute for Mathematical Sciences is hosting an Energy Systems Week, 24-27 May 2010. Full details are available at <http://www.newton.ac.uk/programmes/SCS/esw.html> To apply to participate please fill out the form at www.newton.ac.uk/cgi/ofb-esw; there is no fee for the technical sessions.

The week is divided into three parts:

- A. Mon 24 - Wed 26 May: Tutorial lectures on power system modelling aimed at mathematicians, given by experts in the field. Confirmed speakers are:
 - Ben Hobbs (Johns Hopkins/Cambridge) and Danny Ralph (Cambridge): “What makes electricity different? Dumb Grids, the Ultimate Just-in-Time Problem, and Polar Bears” and “Things we don’t know how to do: Huge nonconvex smart auctions; Combining financial and structural models; and Multilevel games”.
 - Sean Meyn (Illinois): “Dynamic models for electric power markets”.
 - Glenn Vinnicombe (Cambridge): Power system control (title TBC).
 - Janusz Bialek (Durham): “Wide area blackouts: why do they happen and how can modelling help?”
 - Daniel Kirschen (Manchester): “New formulations of the Optimal Power Flow (OPF) problem”.
 - Mark O’Malley (University College Dublin): “Mathematical modelling for wind energy integration studies”.
- B. Wed 26 May: Open for Business, in which academic and industry leaders give a strategic overview of key challenges in the field, followed by a panel discussion and reception. Confirmed speakers are: Sean Meyn (Illinois), Steve Smith (Ofgem), Janusz Bialek (Durham), Chris Murray (National Grid)
- C. Thu 27 May: Industry day, in which industry practitioners outline opportunities, challenges and problems, leading to potential collaborations between academia and industry. Confirmed presenters include representatives from: - Department of Energy and Climate Change (including future uncertainty in economic projection models) - KEMA consulting (smartgrid control) - National Grid Control Centre (demand forecasting) - UK Research Councils Energy Programme.

Bill Morton's 80th Birthday Conference
Oxford, 29 May 2010

Bill (K.W.) Morton was Professor of Numerical Analysis at the Universities of Reading, Oxford and Bath and a pioneer in the development of finite difference, finite element and finite volume methods for the numerical solution of PDEs. He will turn 80 on 28th May this year and to celebrate we have organised a Birthday Conference on Saturday 29th May 2010 in Oxford with the following speakers:

- John Barrett (Imperial)
- Mike Giles (Oxford)
- Heinz-Otto Kreiss (UCLA/KTH)
- Nancy Nichols (Reading)
- Stan Osher (UCLA)
- Alastair Spence (Bath)
- Gil Strang (MIT)

There will be a dinner the same evening in the SCR at Balliol College.

Registration for the day event is free of charge. If you would like to attend the talks at the Computing Laboratory, please send an email with your name, title, and affiliation to Lotti.Ekert@maths.ox.ac.uk.

For details see: <http://www.maths.ox.ac.uk/events/morton80>

Endre Suli, Nick Trefethen, Andy Wathen

Sparse Days at CERFACS
15- 17 June 2010, Toulouse, France.

As is our normal custom, the Parallel Algorithms Team at CERFACS will be holding its annual Sparse Days meeting in June. The Sparse Days this year will be combined with the final meeting of the ANR Solstice Programme. The main themes for this project were: direct methods, hybrid methods, partitioning and ordering, and web access to codes and matrices (GRID-TLSE). Thus we will make these the very non-restrictive theme for our 2010 Sparse Days meeting. The meeting will start on the morning of Tuesday June 15th and finish around midday on Thursday June 17th; the exact schedule will depend on the papers accepted for presentation.

As usual there will be no registration fee, although you must register beforehand with Brigitte Yzel (Brigitte.Yzel@cerfacs.fr). You should also let know Brigitte if you want to stay in the very cheap (but very adequate) on-site accommodation. There will be a conference dinner on Wednesday evening, the cost of which will be announced later.

Yousef Saad and Esmond Ng will give invited presentations and we await acceptance from two others.

Anyone wanting to speak should email Xavier Vasseur (Xavier.Vasseur@cerfacs.fr) with a title and abstract (up to one page in LaTeX or plain text). Normally talks are thirty minutes (including questions) but this could be negotiable (either way). We do not want to have parallel sessions so we will not necessarily be able to accept all submissions. A poster session will be available. Please let us know if you would prefer this mode of presentation.

The deadline for submitting abstracts, registering, and requesting cheap accommodation is 15 May.

For further details, see <http://www.cerfacs.fr/algor/SparseDays2010/index.html>

Integral Methods in Science and Engineering (IMSE2010)
12 - 15 July 2010, University of Brighton.

The eleventh international conference on Integral Methods in Science and Engineering will be held at the University of Brighton from 12-15 July 2010. IMSE2010 will provide an international forum for communicating recent advances in research work that promote the link between mathematics and the applied sciences and engineering. The conference will also provide an opportunity for delegates to exchange information and ideas that support their work.

Further details may be found at <http://www.cmis.brighton.ac.uk/imse2010/> or contact Paul Harris at imse2010@brighton.ac.uk

9th International Conference on Distributed Computing and Applications
in Business, Engineering, and Sciences (DCABES 2010)
10 - 12 August 2010
Hong Kong, China.

The DCABES is a community working in the area of Distributed Computing and its Applications in Business, Engineering, and Sciences, and is responsible for organising meetings and symposia related to the field. The 2010 conference will take place in Hong Kong Lingnan University. Topics include parallel numerical algorithms, optimisation techniques in modern computing environment, and image processing and parallel processing, amongst others. The conference proceedings will be published by IEEE and post-conference journal special issues will be published in the Journal of Algorithms and Computational Technologies.

Conference website: <http://dcabes.meeting.whut.edu.cn/DCABES2010/>

Leverhulme International Network:
Numerical and analytical solution of stochastic delay differential equations
University of Chester, 31st August to 3rd September 2010.

This is the third meeting in a series of four meetings to be organised by the Leverhulme International Network. The Leverhulme International Network, based in Chester and led by Professor Neville Ford, has been established for 3 years from 2008 to 2011, with the aim of bringing together experts from the areas of mathematical modelling, mathematical analysis, numerical and computational methods and stochastic analysis of functional differential equations. All are welcome to this meeting.

For further details contact Nicola Williams (nicola.williams@chester.ac.uk).
Also see <http://www.stochasticdelay.org.uk/>

European Science Foundation / European Mathematical Society conference
Highly Oscillatory Problems: From Theory to Applications
12 - 17 September 2010, Isaac Newton Institute

An ESF/EMS conference on highly oscillatory problems, with an emphasis on their computation, will be held on 12 - 17 September 2010 at the Isaac Newton Institute in Cambridge. The conference is chaired by Arieh Iserles and Claude Le Bris, the other organisers being Folkmar Bornemann, Simon Chandler-Wilde, Bjorn Engquist, Ernst Hairer, Laurence Halpern and Ralf Hiptmair, and it will cover a wide range of subjects, inclusive of electromagnetic and acoustic scattering, wave mechanics, multiscale problems, homogenisation, symplectic algorithms, computational asymptotics, RiemannHilbert techniques and theory of highly oscillatory partial differential equations.

The invited speakers are

- Assyr Abdulle - EPFL Lausanne, CH
- Dario Bambusi - University of Milano, IT
- Oscar Bruno - University of Caltech, US
- Weinan E - University of Princeton, US
- Yalchin Efendiev - Texas A&M, US
- Thanasis Fokas - University of Cambridge, UK
- Irene Fonseca - Carnegie Mellon University (CMU), US
- Daan Huybrechs - Katholieke Universiteit Leuven (KUL), BE
- Caroline Lasser - Freie Universitat Berlin, DE
- Tony Lelièvre - CERMICS - ENPC, FR
- Christian Lubich - University of Tbingen, DE
- Peter Markowich - University of Cambridge, UK
- Houman Owhadi - University of Caltech, US
- Ilaria Perugia - University of Pavia, IT
- Chus Sanz-Serna - University of Valladolid, ES
- Andrew Stuart - University of Warwick, UK
- Isabelle Terrasse - Aerospatiale Paris, FR
- Edriss Titi - Weizmann, IL & UC Irvine, US

Further details and registration information is available at <http://www.esf.org/index.php?id=6532> .

2nd IMA Conference on Numerical Linear Algebra and Optimisation
13-15 September 2010, 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.

The invited speakers are:

- Larry Biegler (Carnegie Mellon University)
- Nick Higham (University of Manchester)
- Adrian Lewis (Cornell University)
- Volker Mehrmann (Technische Universitt Berlin)
- Mike Saunders (Stanford University)
- Valeria Simoncini (Universit di Bologna)
- Jared Tanner (University of Edinburgh)
- Andy Wathen (University of Oxford)

The conference webpage is: http://www.ima.org.uk/Conferences/2nd_numerical_linear_algebra.html

Computational Challenges in PDEs
Swansea, 4th-8th April 2011.

The research programme on Computational Challenges for Partial Differential Equations was held at the Isaac Newton Institute (INI) in Cambridge between January and July in 2003. The programme resulted in important contributions in the fields of adaptivity and error control, the construction and mathematical analysis of multiscale numerical algorithms, the approximation of high-dimensional PDEs and the mathematical analysis of numerical algorithms for general PDEs.

Building on the success of this programme, the INI and the Wales Institute of Mathematical and Computational Sciences (WIMCS) are jointly organising a one week follow-up meeting in 2011. The meeting will consist of 32 invited contributions in the areas of multiscale modelling, interface modelling, PDEs on surfaces and geometric evolution problems, biomedical applications, computational rheology, atomistic to continuum passage, low order modelling and uncertainty modelling.

Further information may be found at http://www.wimcs.ac.uk/INI_Meeting.html

8 Summer Schools

Gene Golub SIAM Summer School 2010
International Summer School on Numerical Linear Algebra (ISSNLA)
Fasano (Bari), Italy. 7-18 June 2010

The first Gene Golub SIAM Summer School takes place at the Centro Internazionale Alti Studi Universitari (CIASU), in Fasano (Bari), Italy. The following four courses will be given during the two weeks 7-18 June 2010.

- Minimizing communication in numerical linear algebra, James Demmel, University of California at Berkeley, USA
- Nonlinear eigenvalue problems: analysis and numerical solution, Volker Mehrmann, Technische Universitaet Berlin, Germany.
- From Matrix to Tensor: The Transition to Computational Multilinear Algebra, Charles Van Loan, Cornell University, Ithaca, New York, USA.
- Linear Algebra and Optimization, Margaret H. Wright, Courant Institute, New York University, USA

The summer school is geared towards doctoral students. There is a limit of 50 students. There is no registration fee. Funding for local accommodations and/or local expenses is available for some of the participants. Limited travel funds are available.

For more information see: <http://www.ba.cnr.it/ISSNLA2010>

This summer school is the second ISSNLA organized by the SIAM Activity group on Linear Algebra. The first took place in 2008 (<http://www.simumat.es/SIAGLA2008>).

9 Software News

News from NAG

A few years ago one of my friends remarked, "Middle Age is when your age starts to show around your middle." Now I find that have even grown out of middle age itself and I find myself describing and extolling features of NAG of which I know little, so apologies in advance for any errors or omissions.

To connect with our younger users, NAG have launched a Blog. This may be accessed via our web page (<http://www.nag.co.uk/>) from the NAGBYTES section or directly via <http://thenumericalalgorithmsgroup.blogspot.com/>.

If you are young or young at heart then you may find the entries interesting. They are intended to stimulate interest in NAG and NAG activities. Looking at this for the first time, it struck me that one

of its best points might be as a useful pointer to good technical articles on the NAG web site. I had seen an earlier copy of David Carlisle's excellent article on calling the NAG Library for .NET from F#, but via the Blog I can see that this is now on the web site at: <http://www.nag.co.uk/numeric/dt/fsharp/>. I doubt whether I could afford the time to keep looking at our site for new additions so the Blog offers a useful service.

Mobile telephones seem to have an inexplicable attraction to the majority of the population. They do have their convenience value and I will admit that I have blown five pounds in the last 4 years on mobile telephone charges, so I do have some experience of the device. For those with a somewhat larger budget, NAG is on Twitter. Fascinating details may be found on our web site at the top right hand corner of our opening web page.

At the time of writing, I can see that Jeremy Walton is giving the NAG Library Introduction training course on the 22 March at Ewha Womans University, Seoul. I am sure Jeremy won't mind if I admit to greater interest in some of the other messages that I can see. It is just that I am not in Korea, Jeremy. Within a few short clicks I found myself looking at <http://eprints.ma.man.ac.uk/1426/> and an article on the matrix exponential. Quite useful really.

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

10 PhD Theses

Marina Menshikova (Cranfield University)

Uncertainty estimation using the moments method facilitated by automatic differentiation in Matlab. <http://hdl.handle.net/1826/4328>

Computational models have long been used to predict the performance of some baseline design given its design parameters. Given inconsistencies in manufacturing, the manufactured product always deviates from the baseline design. There is currently much interest in both evaluating the effects of variability in design parameters on a designs performance (uncertainty estimation), and robust optimization of the baseline design such that near optimal performance is obtained despite variability in design parameters. Traditionally, uncertainty analysis is performed by expensive Monte-Carlo methods. This work considers the alternative moments method for uncertainty propagation and its implementation in Matlab. In computational design it is assumed a computational model gives a sufficiently accurate approximation to a designs performance. As such it can be used for estimating statistical moments (expectation, variance, etc.) of the design due to known statistical variation of the models parameters, e.g., by the Monte Carlo approach. In the moments method we further assume the model is sufficiently differentiable that a Taylor series approximation to a model may be constructed, and the moments of the Taylor series may be taken analytically to yield approximations to the models moments. In this thesis we generalise techniques considered within the engineering community and design and document associated software to generate arbitrary order Taylor series approximations to arbitrary order statistical moments of computational models implemented in Matlab; Taylor series coefficients are calculated using automatic differentiation. This approach is found to be more efficient than a standard Monte Carlo method for the small-scale model test problems we consider. Previously Christianson and Cox (2005) have indicated that the moments method will be non-convergent in the presence of complex poles of the computational model and suggested a partitioning method to overcome this problem. We implement a version of the partitioning method and demonstrate that it does result in convergence of the moments method. Additionally, we consider, what we term, the branch detection problem in order to ascertain if our Taylor series approximation might only be valid piecewise.

11 Vacant positions and studentships

Imperial College

Imperial College London, Department of Chemical Engineering and Chemical Technology. 2 fixed term appointments; each is a 36 month Postdoctoral Research Associate position funded by the ERC Advanced Grant "Complex Interfacial Flows: From the Nano- to the Macro-Scale under the supervision of Dr S Kalliadasis. Salary: £31,340 per annum.

Post 1 The project concerns the theoretical analysis of the dynamics of moving contact lines. The ultimate aim is the development of a rigorous methodology for the treatment of moving contact lines based on first principles. The successful candidate should have a PhD (or equivalent) in Applied Mathematics, Engineering, Physics, or other related area and a strong foundation on general mathematical modelling, mathematical techniques (analytical and numerical). A good knowledge of theoretical fluid mechanics including interfacial/low-to-moderate-Reynolds numbers flows is highly desirable.

Post 2 The project concerns the theoretical formalism of dynamic density functional theory of non-uniform fluids. Of particular interest is a liquid-gas interface in contact with a solid substrate. The ultimate aim is the development of a rigorous microscopic approach for the description of such interfaces based on first principles. Candidates should have a PhD (or equivalent) in Applied Mathematics, Engineering, Physics, or other related area and a strong foundation on general mathematical modelling, mathematical techniques (analytical and numerical) and thermodynamics/statistical mechanics. A good knowledge of density functional theory is highly desirable.

The successful candidates will join a highly interdisciplinary team working on a wide variety of exciting projects at the interface between applied mathematics and engineering science fundamentals.

If you would like to discuss either project, please contact Dr Serafim Kalliadasis at S.Kalliadasis@imperial.ac.uk, Tel: +44-(0)-20-7594-1373, postal address: Department of Chemical Engineering, Imperial College, London SW7 2AZ, UK. For an application form, job description and person specification please see <http://www3.imperial.ac.uk/employment>

Closing date for applications: 22 May 2010.

University of Leicester

The Department of Mathematics at the University of Leicester, is embarking on a major initiative to build a research group in Financial and Actuarial Mathematics, with a numerical emphasis. We are therefore inviting applications for three Lectureships in Applied Mathematics in the areas of Financial Mathematics, Actuarial Mathematics, Financial Engineering, Stochastic Analysis, Statistics/Probability, and Numerical Analysis. Applicants should have an outstanding research record in at least one of these areas and should be able to contribute to MSc degrees in Financial mathematics and Actuarial Science as well as BSc programmes in Financial Mathematics and Mathematics with Economics via teaching courses and project supervision. Preference may be given to applicants who are qualified as FIA/FFA or equivalent.

For more information please contact Professor Jeremy Levesley (jl1@le.ac.uk, 44 116 252 3897), or download an application form and further information from <http://www2.le.ac.uk/jobs> or contact Personnel Services on recruitment3@le.ac.uk or 0116 252 2438.

The post will remain open until filled; an initial review will take place on 19 April 2010.

Salary is in the range £35,646-43,840.

University of Kent

Three year Post-doctoral Research Assistant available from 1 September 2010. The project targets the a priori embedding of conservation laws into numerical code for problems with a variational formulation. Applicants must have a PhD (or equivalent) in mathematics or engineering (with a strong mathematical component) with excellent knowledge and experience in scientific computation, in particular the finite element method. Knowledge of compatible discretisation techniques, geometric integration or Lie group actions (Noether's Theorem) would be a distinct advantage.

The position is funded by EPSRC through the project, "Group actions in function approximation spaces". Mathematical details of the project are available at <http://www.kent.ac.uk/ims/personal/elm2/Proposal-summary.pdf>

All enquiries should be directed to Professor Elizabeth Mansfield (e.l.mansfield@kent.ac.uk) The closing date for applications is 18 April 2010. It is anticipated that interviews will be held on 4 May 2010. Further particulars and the on-line application page is at <http://www.kent.ac.uk/jobs/> Click on Vacancies and search for Job reference number STM0128.

12 Postgraduate Courses

Please see the newsletters dated October 2009 and January 2010 (available at http://www.ima.org.uk/learned_soc/interestgroups.htm) for the most recent information on postgraduate courses.

13 IMA Journal of Numerical Analysis

Contents of Volume 30, Number 2 (see <http://imajna.oxfordjournals.org/>)

- 351-376 Klaus Deckelnick, Gerhard Dziuk, Charles M. Elliott, and Claus-Justus Heine.
An h-narrow band finite-element method for elliptic equations on implicit surfaces.
- 377-400 Alexei Bespalov and Norbert Heuer.
The hp-version of the boundary element method with quasi-uniform meshes for weakly singular operators on surfaces.
- 401-430 Christian Potzsche and Martin Rasmussen.
Computation of integral manifolds for Caratheodory differential equations
- 431-461 B. Cano and M. J. Moreta.
Multistep cosine methods for second-order partial differential systems.
- 462-486 Rodney Taylor and Vilmos Totik.
Lebesgue constants for Leja points.
- 487-511 Morgan Pierre. Uniform convergence for a finite-element discretization of a viscous diffusion equation.
- 512-524 Marko Huhtanen.
Rational approximation of the unitary exponential.
- 525-542 B. R. Boutelje and A. T. Hill.
Nonautonomous stability of linear multistep methods.
- 543-554 Martin D. Buhmann, Slawomir Dinew, and Elisabeth Larsson.
A note on radial basis function interpolant limits.
- 555-578 Kassem Mustapha and Hussein Mustapha.
A second-order accurate numerical method for a semilinear integro-differential equation with a weakly singular kernel.
- 579-594 Benoit Charbonneau, Yuriy Svyrydov, and P. F. Tupper.
Weak convergence in the Prokhorov metric of methods for stochastic differential equations.

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Nick Higham (Manchester)
Daniel Loghin (Birmingham)
David Sayers (NAG)