



DRAFT PROGRAMME

The Fifteenth UK Conference of the Association of Computational Mechanics in Engineering

2-3 April 2007
Glasgow

Venue

The venue for the conference is Glasgow University's Wolfson Medical School Building, a modern landmark building directly on University Avenue. (Building C8 on the attached map).

Timetable

Monday 2 April 2007

09:00 Building opens
09:15-10:00 Registration
10:00-11:15 Opening session & Invited Lectures
11:15-11:30 Coffee
11:30-13:00 Parallel sessions
13:00-14:00 Buffet lunch
14:00-15:45 Invited Lectures
15:45-16:15 Coffee
16:15-17:45 Parallel sessions
19:30-22:30 Conference dinner

Tuesday 3 April 2007

08:00 Building opens
08:30-09:00 Registration
09:00-10:30 Parallel sessions
10:30-11:00 Coffee
11:00-12:30 Parallel sessions
12:30-13:30 Buffet lunch
13:45-15:45 Parallel sessions
16:00-16:30 Coffee & prize ceremony

Presentations

Regular papers are allocated 15 minutes, including question time. Presentations should therefore be no longer than 12 minutes with 3 minutes for questions. Chairmen are asked to keep strictly to the timetable.

The invited lectures are allocated 35 minutes, including question time.

All three presentation rooms are equipped with an OHP, a data projector and a laptop (Win XP + MS PowerPoint + Adobe Acrobat). Authors are requested to meet during the break prior to the start of their session and copy their presentations from portable media (CD, USB-key) onto the local disk.

Presentations can also be sent beforehand by email to production@civil-comp.com provided they are no larger than 5Mb. All presentations received by email will be pre-loaded onto the relevant laptop.

If you decide to bring your own laptop, please keep in mind that any time lost in swapping video cables will come out of your allocated presentation slot.

Conference dinner

The venue for the conference dinner on the evening of the 2nd April is the Lighthouse Building. The Lighthouse, Scotland's award-winning Centre for Architecture, Design and the City, housed in Mackintosh's Glasgow Herald newspaper building, contains the Mackintosh Interpretation Centre and Tower with stunning city views. Upon arrival at the lighthouse building you should go to the Charles Rennie Mackintosh Room (The Mack Room) where the reception will start at 19:30.

The lighthouse is at 11 Mitchell Lane, Glasgow G1 3NU. Try out the Glasgow Underground travel from Hillhead station (just round the corner of the conference venue) to Buchanan Street station. A short walk down Glasgow's foremost shopping street will take you to the lighthouse. A Glasgow street map will be included in your registration pack.

Prize ceremony

The winners of the Crisfield and CTS prizes will be announced at the prize ceremony on Tuesday 2 April at 16:00. The ceremony will take place in the Atrium, where coffee is normally served.

Candidate papers for the Crisfield prizes are shaded in [blue](#) on the programme. Candidate papers for the CTS prize are not marked in any specific way.

Other remarks

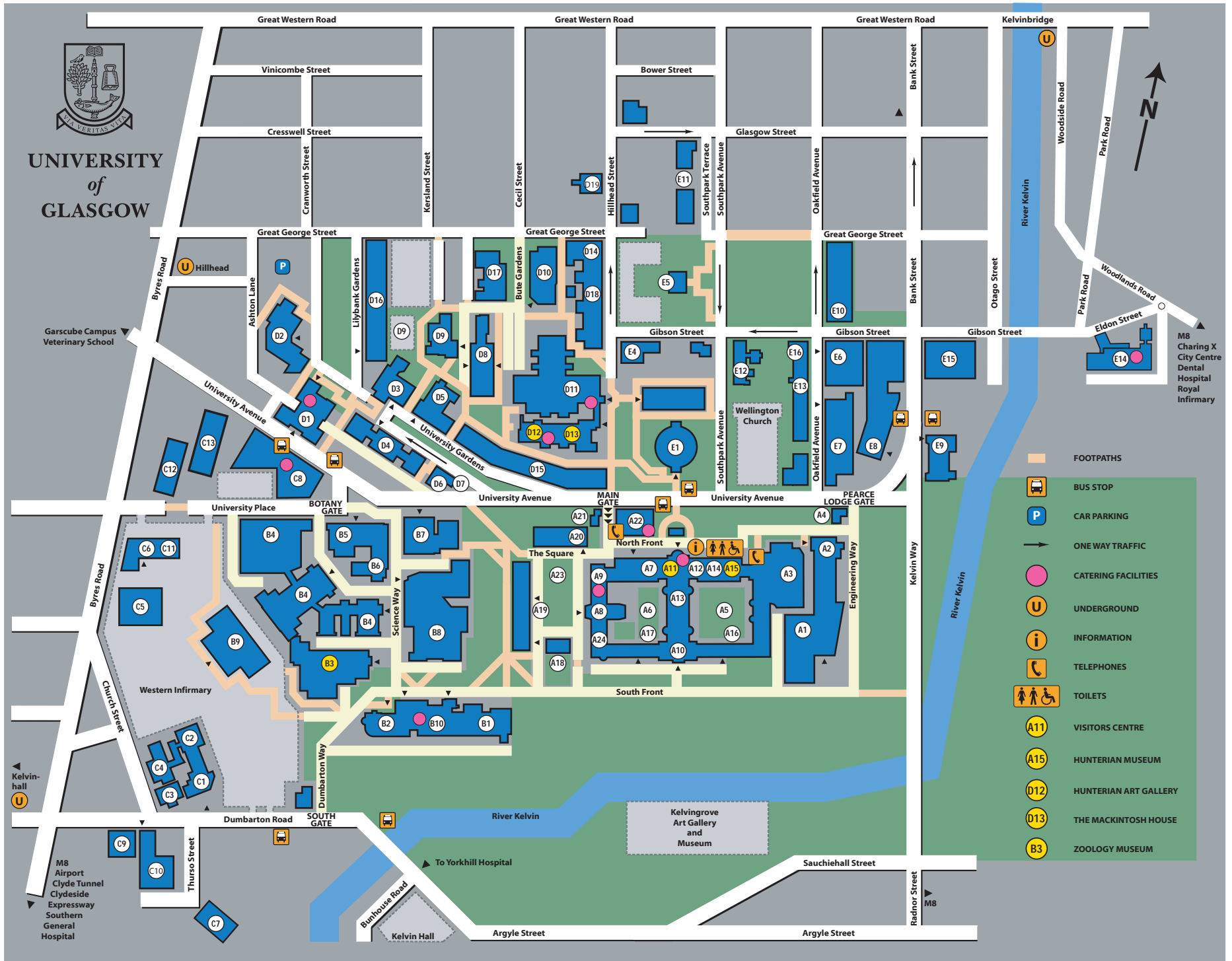
Please switch off all mobiles during the presentations. All public buildings in Scotland are non-smoking.

Draft programme

This is a draft programme, which means that changes may still be made. A copy of the final programme will be inserted in your registration pack. Please verify upon registration that your presentation has not moved. We will endeavour to inform anyone whose presentation is affected by a programme change.



UNIVERSITY of GLASGOW



- FOOTPATHS
- BUS STOP
- CAR PARKING
- ONE WAY TRAFFIC
- CATERING FACILITIES
- UNDERGROUND
- INFORMATION
- TELEPHONES
- TOILETS
- VISITORS CENTRE
- HUNTERIAN MUSEUM
- HUNTERIAN ART GALLERY
- THE MACKINTOSH HOUSE
- ZOOLOGY MUSEUM

Garscube Campus Veterinary School

M8 Charing X City Centre
Hospital
Royal Infirmary

M8 Airport
Clyde Tunnel
Clydeside Expressway
Southern General Hospital

Kelvingrove Art Gallery and Museum

To Yorkhill Hospital



DAY 1 Monday 2 April 2007 AM

09:00 Building opens
09:15-10:00 Registration

Room A

Room B

10:00-10:05 Opening Session
Chair: B.H.V. Topping

Invited Lectures

10:05-10:40 1 Using Mixed Discretisation Schemes in Multi-Physics Simulation, M. Cross, T.N. Croft, D. McBride, A.K. Slone and A.J. Williams

10:40-11:15 2 Is the Whole the Sum of its Parts? -- On Similarities and Differences in Discontinuous Modelling Frameworks, N. Bicanic

11:15-11:30 Coffee
Chair: P.D. Gosling

Chair: N. Bicanic

Finite Element Technology

Biomechanics

11:30-11:45 38 Smooth Finite Element Methods, S. Bordas, N.X. Hung, T. Rabczuk and N.D. Hung

6 [Computational Modelling in Spinal Biomechanics: A Combined Multi-Body Dynamics / Finite Element Approach, V. Esat and M. Acar](#)

11:45-12:00 39 Area Bubble Functions for Stabilization of Mixed Finite Tetrahedral Elements, R. Mahnken, I. Caylak and G. Laschet

7 [On an Inverse Problem in Soft Tissue Elastography, Z.Y. Guo and N. Bicanic](#)

12:00-12:15 40 A Theory of Finite Elements and Its Application, P.O. Tuominen

8 [Aspects of Modelling and Large Scale Simulation of Arterial Walls, D. Brands, A. Klawonn, O. Rheinbach and J. Schröder](#)

12:15-12:30 41 [Locally Enriched Finite Elements for the Helmholtz Equation, O. Laghrouche and M.S. Mohamed](#)

9 [Investigation of an Implant for the Treatment of the Fracture of Cortical and Trabecular Bones, V.L. Kidgell, O. Hassan and Y.T. Feng](#)

12:30-12:45 42 [Follower Tension Buckling of Columns using Fourier p-10 elements, J. Fan and A.Y.T. Leung](#)

[Fluid-Structure Interaction Simulations on an Idealised Abdominal Aortic Aneurysm Model, S. Kelly and M. O'Rourke](#)

12:45-13:00 43 [A New Objective Function for Mesh Untangling, Smoothing, Refinement and Coarsening, X. Gu and B. Svendsen](#)

11 [A Combined Experimental and Numerical Investigation into Early Atherosclerosis, N.M. Quinn, A. Ivankovic and A. Karac](#)

13:00-14:00 Lunch

DAY 1 Monday 2 April 2007 PM

Room A

Chair: C.G. Armstrong

Invited Lectures

- 14:00-14:35 3 Stochastic Structural Optimisation with Quadratic Loss Functions, K. Marti
- 14:35-15:10 4 Mixed and Hybrid Stress Elements for Biphasic Media, J.A. Teixeira De Freitas, I.D. Moldovan and M. Toma
- 15:10-15:45 5 Formulation and Finite Element Implementation of Dynamically Consistent Gradient Elasticity, H. Askes, I.M. Gitman and T. Bennett

15:45-16:15 Coffee

Chair: M. Rouainia

Finite Volume Methods

- 16:15-16:30 44 Flux Continuous Finite Volume Schemes with Full Pressure Continuity, H. Zheng, M.G. Edwards and M. Pal

Solution Methods

- 16:30-16:45 45 Further Research on a Self-adapt SOR Solver for Linear Equation Systems, G. Duan and A.H.C. Chan

Boundary Elements

- 16:45-17:00 46 Adaptive Space-Time Boundary Element Method for Three-Dimensional Scalar Wave Propagation, J.X. Zhou, T. Koziara and T.G. Davies

- 17:00-17:15 47 Solving Two-Dimensional Orthotropic Potential Cauchy Problems of Thin Bodies using the Boundary Element Method, H.L. Zhou, Z.W. Guan and Z.R. Niu

- 17:15-17:30 48 A FEM-SBFEM Coupled Method for Fully-Automatic Modelling of Cohesive Discrete Crack Propagation, Z.J. Yang and A.J. Deeks

17:30-17:45

19:30-22:30 Conference Dinner

Room B

Chair: E.A.W. Maunder

Biomechanics (continued)

- 12 Mechanical Analysis of Bamboo Stems, A. Lengyel and E. Pintér

- 13 Flux-Continuous Schemes for Solving EEG Source Localization Problems, M. Pal, D. Gupta, M.G. Edwards and C.J. James

Materials Modelling

- 14 A Hyperelastoplastic ALE Formulation based on Spatial and Material Forces, Z. Uthman and H. Askes

- 15 Compact Plasticity Algorithm for Pressure-Sensitive Media, T. Li and R. Crouch

Micro-Mechanics

- 25 Some Finite Elements for Elasticity with Microstructure and Gradient Elasticity, A. Zervos

Crack Modelling

- 29 Hybrid-Trefftz Elements for Cohesive Crack Propagation in Quasi-Brittle Materials, L. Kaczmarczyk and C.J. Pearce

Room C

Chair: M. Cross

Parallel Computing

- 54 The Implementation of an Element by Element Preconditioned Conjugate Gradient Solver for a Novel Multithreaded Array Processor, V. Szeremi and L. Margetts

- 55 Parallel Modal Analysis using Distributed Objects, B.C.P. Heng and R.I. Mackie

- 56 FPGA-Based Acceleration of the Three-Dimensional Finite Difference Floating Point Solution of the Laplace Equation, J. Hu, E.J.C. Stewart, S.F. Quigley and A.H.C. Chan

Optimization

- 57 Equilibration of Configurational Forces in the Tendon Layout Optimisation of Pre-stressed Concrete Structures, S. Eurviriyankul and H. Askes

- Controlling Single-Node Connections in Plane and in Space, V. Pomezanski

- 59 Optimum Design and Sensitivity Analysis of Shallow Space Structures using an Improved Meta-Heuristic Method, A. Csébfalvi and G. Csébfalvi

DAY 2 Tuesday 3 April 2007 AM before Coffee

08:00 Building opens

08:30-09:00 Registration

Room A

Chair: O.. Laghrouche

Computational Modelling for Struct. Mech.

09:00-09:15 71 Numerical Modelling of the Impact Behaviour of High Aspect Ratio Aluminium Foam Filled Sections, F. Teixeira-Dias, V. Miranda and J. Pinho-da-Cruz

09:15-09:30 72 [Effective Stress Analysis of Gravity Quay Walls under Earthquake Loading](#), M. Alyami, M. Rouainia and S.M. Wilkinson

09:30-09:45 73 [Metal Shear Panels as an Innovative System for Seismic Upgrading of Existing RC Buildings: From Numerical Analyses to Full-Scale Experimental Tests](#), A. Formisano, G. De Matteis, S. Panico and F.M. Mazzolani

09:45-10:00 74 [Numerical Methods for the Design of Face Worm Gears with Double-Lead Worm](#), A. Gessner

10:00-10:15 75 Design Charts for the Plastic General Instability of Ring-Stiffened Conical Shells under External Hydrostatic Pressure, C.T.F. Ross, A.P.F. Little, R. Allsop, C. Smith and M. Engelhardt

10:15-10:30 76 Computational Modelling of Metal-to-Metal Seals, A.D. Taft, A.W. Lees and M. Cross

10:30-11:00 Coffee

Room B

Chair: H. Askes

Coupled Methods and Problems

16 [Drying of a Multilayer Ceramic Shell Body](#), Z. Harun, D.T. Gethin, R.W. Lewis and W.J. Ferguson

17 Finite Elements and Lattice Boltzmann for Heat Transfer: Compared and Combined, I.W. Haslam and R.S. Crouch

18 Finite Element Solution of Coupled Chemo-Poroelasticity, W. Pao, S.W. Wong and R.W. Lewis

19 Modelling of Transport Processes in Concrete at Elevated Temperatures, K. Kukla, C.J. Pearce, C.T. Davie and N. Bicanic

20 Thermomechanical Analysis of an Elastic-Plastic Semi-Infinite Medium in Sliding Contact with a Fractal Surface, A. Ozer and H. Sofuoglu

Soil-Structure Interaction

78 Coupling Methods for Modelling Nonlinear Soil-Structure Interaction, H.Z. Jahromi, B.A. Izzuddin and L. Zdravkovic

Room C

Chair: C.J. Pearce

Composites

63 Size Effect of Cohesive Delamination Fracture Triggered by Sandwich Skin Wrinkling, Z. Bazant and P. Grassl

64 Numerical Simulation of Large Deformation Response of Hyperelastic Fibre Reinforced Composites, Z.Y. Guo, X.Q. Peng and B. Moran

65 Collapse of Composite Tubes made from a Carbon and Glass Fibre Combination under Uniform External Pressure, C.T.F. Ross, M. Engelhardt and A.P.F. Little

Fluid-Structure Interaction

61 Large-Scale Fluid-Structure Interaction Simulation of Viscoplastic and Fracturing Thin-Shells Subjected to Shocks and Detonations, F. Cirak, R. Deiterding and S.P. Mauch

62 [A Partitioned Approach for the Solution of Three-Dimensional Time-Dependent Incompressible Fluid-Structure Interaction](#), C. Wood, A.J. Gil, O. Hassan and J. Bonet

DAY 2 Tuesday 3 April 2007 AM after Coffee

Room A

Chair: A.D. Jefferson

Comp. Modelling for Struct. Mech. (Cont.)

- 11:00-11:15 77 An Approach for Shape Error Quantification in Forging Compressor Blades using FE Modelling and CMM Inspection, J. Makem, H. Ou and C.G. Armstrong

Simulation

- 11:15-11:30 33 Modular Modelling in Computational Mechanics Research, R.A. Hiley, P.D. Gosling and M. Rouainia

- 11:30-11:45 34 A Simple Method to Evaluate Trimming Operations on Hot Forged Blade Components, B. Lu, H. Ou and C.G. Armstrong

- 11:45-12:00 35 [Investigation of the Traffic Flow on an Intersection using a Cellular Automaton Model](#), H.D. He, W.Z. Lu, A.Y.T. Leung and L.Y. Dong

- 12:00-12:15 36 Numerical Simulation of Spanish Bell Ringing, S. Ivorra, E. Segovia, R. Irlas and F. Pallarés

- 12:15-12:30 37 [Velocity Mapping Procedures for Tidal Stream Turbines in an Arbitrary Flow Field and the Implications on Performance Due to Non-Uniform Flow](#), J. Chapman, J.A.C. Orme and I. Masters

12:30-13:30 Lunch

13:00-13:45

Room B

Chair: A.H.C. Chan

Soil and Geotechnical Modelling

- 79 A Numerical Procedure for Fitting the Parameters used by the Kosugi Model to Predict Hydraulic Properties of Bi-Modal Soils, L. Jendele and M. Kutilek

- 80 Do Lumped-Parameter Models Provide the Correct Geometrical Damping?, L. Andersen

Concrete Structures

- 81 Numerical Modelling of Time-Dependent Effects in Concrete Structures, J.I. Lee and A. Scanlon

Discrete Element Methods

- 82 Modelling of the Fracture Process Zone of Concrete, P. Grassl and M. Jirásek

- 83 On the Modelling of Temperature Loading of Concrete using a Discrete Approach, C.J. Pearce and P. Grassl

Stochastic Modelling

- 84 [A Multi-Scale based Stochastic Modelling of Discrete Elements with Rough Surfaces](#), J. Kato and Y.T. Feng

Room C

Chair: R.S. Crouch

Flow in Porous Media

- 66 Higher Resolution Convection Schemes for Porous Media Flow Computation on Highly Distorted Unstructured Grids, S. Lamine and M.G. Edwards

- 67 A Damage-Based Diffusivity Model for Moisture Transport in Cementitious Media, A.H. Al-Gadhib, W. Pao, S.W. Wong and R.W. Lewis

Computational Fluid Dynamics

- 68 Numerical Modelling of the Required Pressures for Advancing Water to Overcome Capillary Valve Hindrance in a Lab-on-a-CD, N. Leal, G. Silva and V. Semiao

- 69 Flow Path Simulation and Stress Analysis of a HP Bypass Valve, T.V.K. Bhanuprakash, L. Vishnuvardhan and K. Ramesh

- 70 [A CFD Analysis of a Complete Double Entry Centrifugal Pump](#), R.R.G. Spence and J. Amaral-Teixeira

ACME-UK Committee meeting

DAY 2 Tuesday 3 April 2007 PM

Room A

Chair: K. Marti

13:45-14:00

Micro-Mechanics

14:00-14:15 23 A Framework for Stochastic Micromechanics, S.C. Baxter and T.O. Williams

14:15-14:30 26 Towards the Micro-Structural Analysis of Open-Celled Foams through the Compaction Regime, F.J. Calvo, L. Margetts and I.M. Smith

14:30-14:45 21 Scale Transition for Computational Homogenization, L. Kaczmarczyk, C.J. Pearce and N. Bicanic

14:45-15:00 27 An Algorithm for Statics of Dry Masonry, T. Koziara and N. Bicanic

15:00-15:15 28 Three-Dimensional Imaging Techniques for Material Characterisation, V. Bui Xuan, P. Young, G. Tabor and G. Limbert

15:15-15:30 24 Towards Hybrid Equilibrium Elements for Microcontinua, E.A.W. Maunder and C.W. Smith

15:30-15:45 22 Micromechanical based Model for Cementitious Composite Materials, A.D. Jefferson and T. Bennett

16:00-16:15 Prize Ceremony

16:15-16:30 Coffee

Room B

Chair: J.A.T. de Freitas

Plates

32 Finite Element Analysis of Composite Patch Repaired Plates with Circular Stress Raisers used for SIF Reduction, G.J. Tsamasphyros, K. Kalkanis, Th.K. Papathanassiou and C. Vrettos

31 Comparison of Various Kinematics for the Analysis of Functionally Graded Materials Plates, E. Carrera, S. Brischetto and A. Robaldo

30 Laminated Plate Modelling: Total Lagrange Formulation with Transverse Shear Strains, A.J. Shaw and P.D. Gosling

Meshfree Methods

51 An Enriched Meshfree Method for Multiple Cracks in Three Dimensions, T. Rabczuk, S. Bordas and G. Zi

52 A Novel Generalized Continuum Approach for Modelling Size-Scale Effects and Oriented Material Behaviour, S. Skatulla and C. Sansour

53 The Stochastic Meshless Method and the Immune Algorithm for Structural Reliability, S.H. You, X.Q. Li, Z.J. Chen and X.P. Wan

Adaptive and Error Procedures

49 First Attempts at A Posteriori Error Estimation in eXtended Finite Element Methods, S. Bordas and M. Duflo

50 Adaptive Generation of Arbitrary Grids and its Application in Finite Difference Analysis of Three-Dimensional Continua, G.M. Cocchi

Room C