



**22nd ACME Conference on Computational  
Mechanics & 3rd ACME School**

**ACME 2014**



**PROVISIONAL  
CONFERENCE  
PROGRAMME**

March 2014

ACME2014 ORGANISING COMMITTEE

University of Exeter, UK

## PROGRAMME

1- ACME School (Harrison Building)

**Wednesday, 2nd April 2014** (Room 203)

14:00- 14:45 Lecture 1: Isogeometric analysis of shells at finite deformations

Prof. Sven Klinkel

14:45- 15:30 Lecture 2: 3D Isogeometric finite elements for fluid flow

Dr. Ido Akkerman

15:30- 16:00 Coffee break (Room 106)

16:00- 16:45 Lecture 3: Isogeometric boundary elements

Dr. Robert Simpson

16:45- 17:30 Lecture 4: Image-based meshing

Prof. Philippe Young

2- ACME Conference (Harrison Building)

**Thursday, 3rd April 2014**

08:45-09:10 Registration

09:10- 09:30 Opening session

09:30- 10:10 Keynote lecture 1

10:10- 10:30 Coffee break

10:30- 12:30 **Parallel Sessions**

- Numerical Methods –I
- Geomechanics-I
- Fracture and Failure Mechanics –I

12:30- 13:30 Lunch

13:30- 14:00 Keynote lecture 2

14:00- 15:40 **Parallel Sessions**

- Numerical Methods –II
- Geomechanics-II
- Fracture and Failure Mechanics -II

15:40- 16:00 Coffee break

16:00- 17:00 **Parallel Sessions**

- Structures I
- Thermal analysis
- Materials, Elasticity I

19:00-22:00 Dinner

**Friday, 4th April 2014**

09:00-09:40 Keynote lecture 3

09:40- 11:00 **Parallel Sessions**

- Structures-II
- Isogeometric Analysis
- Materials, Elasticity II

11:00-11:20 Coffee break

11:20- 12:40 **Parallel Sessions**

- Contact Mechanics
- Optimisation, Data Mining I
- Fluid Mechanics, CFD- I

12:40- 13:40 Lunch

13:40-15:20 **Parallel Sessions**

- Materials, Elasticity III
- Optimisation, Data Mining II
- Fluid Mechanics, CFD- II

15:20-16:00 Prize Session and Conference closure

## DETAILED PROGRAMME OF CONFERENCE

**3rd April 2014**

08:45-09:10	<b>Registration /Harrison Foyer</b>		
09:10-09:30	<b>Opening Session, Room 103</b>		
09:30-10:10	<b>Keynote Lecture 1:</b> Geoenergy Research Applications / <b>Prof. Hywel Thomas</b>		<b>Room 103</b>
10:10-10:30	<b>Coffee Break (Room 102)</b>		
Parallel sessions	<b>Room 103 Numerical Methods-I Chair: Charles Augarde</b>	<b>Room 209 Geomechanics-I Chair: Tom Schanz</b>	<b>Room 106 Fracture and Failure Mechanics -I Chair: Chris Pearce</b>
10:30-10:50	Summation rules for higher order Quasi-continuum methods  Claire Heaney, Lars Beex and Pierre Kerfriden	Numerical modelling of the impacts of sea level rise on seawater intrusion in unconfined coastal aquifers  Mohammed Hussain, Akbar Javadi and Victor Robin	A direct method to evaluate stress intensity factors using enriched BEM  Ibrahim Alatawi and Jon Trevelyan
10:50-11:10	Meshfree volume-averaged nodal pressure methods for incompressible elasticity  Jack S. Hale, Alejandro Ortiz and Christian J. Cyron	Digital data acquisition for effective slope management  Matthew Eyre, Denise Pascoe, Patrick Foster and John Coggan	Meso-scale fracture modelling of concrete with random aggregates and pores  Xiaofeng Wang, Zhenjun Yang and John R. Yates
11:10-11:30	Energy-momentum method for beam dynamics  Tien Long Nguyen, Carlo Sansour and Mohammed Hjjaj	A coupled hydro-mechanical analysis of slope instability processes in San Leo (RN, Italy)  Long Nguyen-Tuan, Margherita C. Spreafico, Maria Datcheva, Lisa Borgatti and Tom Schanz	Computational modelling of hydraulic fracture  Guoqiang Xue, Lukasz Kaczmarczyk and Chris Pearce
11:30-11:50	A q-refinement procedure for radiative heat transfer in glass  M Shadi Mohamed, Mohammed Seaid, Jon Trevelyan and Omar Laghrouche	Coupled discrete element and lattice boltzmann scheme for simulating soil erosion  Min Wang, Y.T. Feng and Gyan Pande	3D Meso-Scale image-based fracture modelling of concrete using cohesive elements  Wenyuan Ren, Zhenjun Yang and Rajneesh Sharma
11:50-12:10	Wave modelling using enriched finite elements  Konstantinos Christodoulou, Omar Laghrouche and Shadi Mohamed	Deformation and safety control of buried pipelines crossed by very large diameter slurry shield tunnelling  Jing Ni, You-Liang Chen and Hui-Zi Zhao	Failure analysis of 3D graphite bricks in an AGR core  Costy Kodsı, Łukasz Kaczmarczyk and Chris Pearce
12:10-12:30	Numerical methods for subsurface reservoir simulation: boundary aligned grid generation and flux approximation schemes  Shahid Manzoor, Michael Edwards, Ali Dogru and Tareq Al-Shaalan	A review of the material point method and its links to other computational methods  Tim Charlton, Will Coombs and Charles Augarde	Global energy minimization for multi-crack growth in linear elastic fracture using the extended finite element method  Danas Sutula, Stephane P. A. Bordas, Pierre Kerfriden and Alexandre Barthelemy
12:30-13:30	<b>Lunch (Room 102)</b>		

3<sup>rd</sup> April 2014

13:30-14:00	<b>Keynote Lecture 2:</b> Application of unsteady aerodynamic simulation in automotive engineering / <b>Mr. Adrian Gaylard</b> <span style="float: right;">Room 103</span>		
Parallel sessions	Room 103 <b>Numerical Methods -II</b> Chair: <b>Jon Trevelyan</b>	Room 209 <b>Geomechanics -II</b> Chair: <b>Omar Laghrouche</b>	Room 106 <b>Fracture and Failure Mechanics -II</b> Chair: <b>Carlo Sansour</b>
14:00-14:20	A coupled Partition of Unity FEM-collocation BEM for acoustic wave scattering in heterogeneous media in two dimensions  Ganesh Diwan, Jon Trevelyan and Graham Coates	3D-FEM numerical simulation of ground surface displacement due to short-distance multi-line overlapped shield tunnelling  Lei Li and Mengxi Zhang	Numerical modelling of brittle fracture in geological materials  John Coggan, Doug Stead and Fuqiang Gao
14:20-14:40	3D leap-frog scheme for electromagnetic scattering by dielectric media using unstructured meshes  Alex Gansen, Mohamed El Hachemi, Salim Belouettar , Oubay Hassan and Kenneth Morgan	A numerical investigation into the effect of particle form on the strength of granular materials.  Matthew Potticary, Antonis Zervos and John Harkness	Three-dimensional brittle fracture: configurational-force-driven crack propagation  Lukasz Kaczmarczyk and Chris Pearce
14:40-15:00	An enriched quadtree/octree implicit boundary finite element method for the simulation of incompressible hyperelastic materials  Jack S. Hale, Pierre Kerfriden, Juan J. Ródenas García and Stéphane P. A. Bordas	An anisotropic constitutive model for cyclic loading of soft clays  Mohammad Rezaia, Hesam Dejaloud, Mohaddeseh Mousavi Nezhad and Yaser Jafarian	Extracting stress intensity factors of 3-D cracks using displacement correlation method applied on an unstructured mesh  Morteza Nejati, Adriana Paluszny and Robert W. Zimmerman
15:00-15:20	A three-dimensional implementation of the boundary element and level set based structural optimisation  Baseer Ullah, Jon Trevelyan and Ioannis Ivrisstziz	Effect of permeability variation with depth on soil resistance to caisson penetration  Moura Mehavar, Ouahid Harireche and Amir.M Alani	Mixed-dimensional multi-point flux approximation for discrete fracture-matrix simulation  Raheel Ahmed, Michael Edwards and Mayur Pal
15:20-15:40	Nonlinear analysis of masonry arches and bridges using MESOSCALE partitioned modelling  Yanyang Zhang, Lorenzo Macorini and Bassam Izzuddin		A Multi-Scale stochastic fracture modelling calibration using Monte Carlo simulations  Razvan Sencu, Zhenjun Yang and Yong Wang
15:40-16:00	<b>Coffee Break (Room 102)</b>		

3<sup>rd</sup> April 2014

Parallel sessions	Room 103 <b>Structures-I</b> Chair: <b>Edward Maunder</b>	Room 209 <b>Thermal Analysis</b> Chair: <b>John Coggan</b>	Room 106 <b>Materials, Elasticity I</b> Chair: <b>William Coombs</b>
16:00-16:20	Co-rotational formulation for sandwich plates and shells  Yating Liang and Bassam A. Izzuddin	Temperature data analysis from field scale thermal monitoring  Majid Sedighi, Daniel P. Bennett, Shakil A. Masum, Hywel R. Thomas, Erik Johansson and Topias Siren/	Constitutive modelling for cytoskeletal contractility of smooth muscle cells  Tao Liu
16:20-16:40	An equilibrium finite element model for shells with large displacements  Edward Maunder and Bassam Izzuddin	Stochastic thermomechanical analysis of nuclear graphite using PARAFEM  Jose David Arregui-Mena, Lee Margetts, Louise Lever, Graham Hall and Paul Mummery	Computational modelling of braided fibre embedded in concrete  Michael Cortis, Lukasz Kaczmarczyk and Chris Pearce /
16:40-17:00	Dynamic modeling and analysis for flexible space web  Qingbin Zhang, Zhiwei Feng and Tao Yang	Computational thermal conductivity in porous materials: numerical and statistical approaches  Ahmed El Moumen, Abdellatif Imad and Toufik Kanit	Multiscale modelling of the textile composite materials  Zahur Ullah, Lukasz Kaczmarczyk, Michael Cortis and Chris Pearce
19:00-22:00	<b>Dinner (Reed Hall Restaurant)</b>		

4th April 2014

09:00-09:40	<b>Keynote Lecture 3:</b> Partitioned Modelling for Nonlinear Analysis of Large-Scale Structural Systems using High Performance Computing Room <b>103</b> / <b>Prof. Bassam Izzuddin</b>		
Parallel sessions	Room <b>103</b> <b>Isogeometric Analysis</b> Chair: <b>Robert Simpson</b>	Room <b>209</b> <b>Structures-II</b> Chair: <b>Bassam Izzuddin</b>	Room <b>106</b> <b>Materials, Elasticity II</b> Chair: <b>Philippe Young</b>
09:40-10:00	3D extended isogeometric boundary element method (XIBEM) for acoustic wave scattering  Michael Peake, Jon Trevelyan and Graham Coates	Performances of rubber bearings by varying the rubbers properties  Maria Rosaria Marsico and Harry Norman	A computational framework for polyconvex large strain electromechanics  Rogelio Ortigosa, Antonio J. Gil and Javier Bonet
10:00-10:20	A hybrid IGAFEM/IGABEM formulation for two-dimensional stationary magnetic and magneto-mechanical field problems  Stefan May, Markus Kästner, Sebastian Müller and Volker Ulbricht	Kriging models for compensating thermal response in measurements from bridge monitoring  Rolands Kromanis and Prakash Kripakaran	Homogeneous response of random structured material concrete with realistic microstructure  Rajneesh Sharma, Wenyuan Ren and Zhenjun Yang
10:20-10:40	Multiphysics simulations of smart structures using isogeometric finite elements  Christian Willberg and Sascha Ducek	Delay optimization in real time dynamic substructuring tests on a cable-deck system  Maria Rosaria Marsico and David Wagg	Viscoelastic modelling of wood-water interactions using finite difference modelling  Euan Richardson and Karin de Borst
10:40-11:00	An isogeometric model for earthquake fault rupture with weakening friction  Julien Vignollet, Stefan May and René de Borst	Assessing the remaining safe life of concrete sewer pipes using stochastic finite element method  Asaad Faramarzi and Amir M. Alani	Finite strain modelling for the curing process in magneto-viscoelasticity  Mokarram Hossain, Prashant Saxena and Paul Steinmann
11:00-11:20	<b>Coffee Break (Room 102)</b>		

4th April 2014

Parallel sessions	Room 103 <b>Contact Mechanic</b> Chair: <b>Chris Pearce</b>	Room 209 <b>Optimisation, Data Mining I</b> Chair: <b>Mahmoud Nachabe</b>	Room 106 <b>Fluid Mechanic, CFD-I</b> Chair: : <b>Adrian Gaylard</b>
11:20-11:40	Quasi-static analysis of self-cleaning surface mechanisms  Muhammad Osman and Roger A. Sauer	Research on potable water network automatic flush device operation optimization  Xiongfei Xie, Mahmoud Nachabe and Bo Zeng	Modelling of micro-scale droplets subject to surface acoustic waves  Ross Mackenzie, Lukasz Kaczmarczyk and Chris Pearce
11:40-12:00	Non-linear models of frictional heating during braking  Piotr Grzes	Pressure gauge placement design for water network hydraulic calibration  Xiongfei Xie, Mahmoud Nachabe and Bo Zeng	Computational modelling of an estuary in the frame of the optimisation of tidal farms  Miriam Garcia, Gavin Tabor and Slobodan Djordjevic
12:00-12:20	Space-Time discretization of frictional rolling contact in deformable bodies  Reza Yazdanparast, Abbas Moradi and Mohsen Safajuy	Optimisation of a venturi mixer design to promote efficient combustion in a pre-mix burner  Jennifer Thompson, Oubay Hassan and Sam Rolland	Multi-dimensional models of the interior of stars  Jane Pratt, Maxime Viallet, Isabelle Baraffe, Chris Geroux, Tom Goffrey, Mikhail Popov, Doris Folini and Rolf Walder
12:20-12:40	Finite element based contact solution for tractive rolling contact of graded coating  Reza Yazdanparast, Abbas Moradi and Mohsen Safajuy	Modelling swelling induced lateral pressure transmission control on retaining structures in expansive soils  A.Ahangar-Asr	An HP-FEM framework for the simulation of coupled magneto-fluid effects  Darong Jin, Paul D. Ledger and Antonio J. Gil
12:40-13:40	<b>Lunch (Room 102)</b>		

4th April 2014

Parallel sessions	Room 103 <b>Materials, Elasticity III</b> Chair: <b>Zhenjun Yang</b>	Room 209 <b>Optimisation, Data Mining II</b> Chair: <b>Asaad Faramarzi</b>	Room 106 <b>Fluid Mechanic, CFD-II</b> Chair: <b>Gavin Tabor</b>
13:40-14:00	Analysis of thermal stress distribution in brake disc during single braking under non-axisymmetric load  Adam Adamowicz	Level set optimisation method for continuous fibres paths  Christopher Brampton and H Alicia Kim	An immersed structural potential method framework for incompressible flexible/rigid/multi-phase flow interaction  Liang Yang, Aurelio Arranz Carreño, Antonio Gil and Javier Bonet
14:00-14:20	Breaking periodicity in material simulations  Jan Novak, Martin Doskar and Martin Horak	Analysis of the dynamic response of a large deep karst aquifer by data-driven modelling  Angelo Doglioni and Vincenzo Simeone	Fluid-structure interaction simulation of parachute finite mass inflation  Xinglong Gao, Qingbin Zhang and Qiangang Tang
14:20-14:40	Mixed finite element formulations for strain gradient elasticity in FEniCS  Veena Phunpeng	Identification of morphological anomalies by 2D discrete wavelet transform  Angelo Doglioni and Vincenzo Simeone	Higher resolution cell-centred finite-volume schemes on unstructured grids for multi-phase flow in a porous medium  Yawei Xie, Michael G. Edwards and Mayur Pal
14:40-15:00	Thermal Finite Element Analysis of Ceramic/Metal Joining for Fusion Using X-ray Tomography Data  Llion Evans	Lateral load bearing capacity model for piles in cohesive soils  Alireza Ahangar-Asr	Maximum-entropy finite element approximation of the incompressible fluid flow equations  Musabbir Abdul Majeed and Fehmi Cirak
15:00-15:20	High temperature protective coatings for aviation gas turbines  Arif J. Pashayev, Adalat S. Samedov, Tural B. Usubaliyev and Rzagulu Agaverdiyev		
15:20-16:00	<b>Prize ceremony &amp; Conference closure</b>		



## INFORMATION FOR PRESENTERS

### Oral presentation guidelines

- Time for oral presentations is 15 minutes for your talk followed by 5 minutes questions and answers (keynote lectures are allocated 30 minutes for presentation and 5 minutes for Q&A). The time limits will be strictly followed.
- Computers that will be used for presentations have Windows & Microsoft Office 2010 and PDF or PowerPoint files should be used. Presentations prepared on Macintosh should be formatted accordingly.
- It is recommended that slide appearance and any special effects like animation or sound are checked in advance during breaks.
- Internet connection will be available in conference rooms. Should you need to use Internet for your presentation, please check well in advance that it works as expected.
- Please bring your presentation files on a USB memory stick to your session room during a break WELL BEFORE the start of your session.
- Please be in the session room at least ten minutes before the beginning of your session, introduce yourself to the Session Chair and provide concise biographical information (ideally on paper) so that s/he can briefly introduce you to the audience.

## GENERAL INFORMATION

### Catering

Refreshments and lunch will be provided in the Harrison Building as indicated on the programme.

The buffet lunches and refreshments breaks for your event will be served in the following areas:

Wednesday Room 106  
Thursday Room 102  
Friday Room 102

The Conference Dinner will be held 19:00 – 22:00 on Thursday 3<sup>rd</sup> April in Reed Hall restaurant.

### Internet access

Internet access will be available for delegates. Username and Password will be provided.

### Accommodation address

Pennsylvania Court  
St German's Road  
Exeter  
EX4 6TP

Lopes Hall Office  
Phone +44 (0)1392 725286

Lopes Hall Porters Lodge  
Phone +44 (0)1392 725624

### Car Parking

- There will be parking permit with accommodation.
- Delegates are able to park in any of the car park on campus on a pay and display basis.

### Conference Venue

The Conference will be held at the University of Exeter, situated on an attractive campus close to the city centre. School and conference technical sessions will be held in the Harrison Building.

### How to get around

Harrison Building is located 20-25 minute walk from the city centre. Taxi is available with fares costing between £5 - £8. Taxi can be called from Harrison Building Reception or Pennsylvania Court reception. The recommended companies are:

Capital Taxi  
Phone 01392 434343

Gemini Taxi  
Phone 01392 666666

### Public transportation

You can also get around by Bus D from different locations on the campus. Bus fare is £1.10 one way. Bus D operates between 8am till midnight Monday- Saturday. There are no buses on campus on Sundays.