Conference Schedule

Second M.I.T. Conference on Computational Fluid and Solid Mechanics

June 17-20, 2003

The mission of the Conference:
To bring together Industry and Academia and
To nurture the next generation in computational mechanics

This document contains the following information in this order:

- Chronological List of Plenary Lectures and Sessions
- Room Allocations for Sessions
- Index to Sessions by Session Number
- Session Details by Session Number

Notes

Please note the special Plenary Panel Discussion:

Thursday 7:00 - 9:00pm Room: 10-250
Providing Virtual Product Development Capabilities for Industry: The Human Element

Please note that in all rooms, a transparency projector and a beamer for PowerPoint presentations will be available. But for PowerPoint presentations, the presenter must bring her/his own laptop. For any questions regarding the equipment, or special requirements, please contact conferences-www@MIT.EDU.

Tuesday 8:45am

Welcome
Professor Klaus-Jürgen Bathe

Opening of Conference
Professor Alice P. Gast, Vice President for Research, M.I.T.

Plenary Lectures
Chairperson: J.W. Tedesco

9:00 - 10:30am

Room: Kresge Auditorium (W16)

Biological Simulations at All Scales: From Cardiovascular Hemodynamics to Protein Molecular Mechanics
R.D. Kamm, M.I.T.

The Role of CAE in Product Development at Ford Motor Company
S.G. Kelkar and N.K. Kochhar, Ford Motor Company

10:30 - 11:00am
Coffee Break

Tuesday 11:00am - 12:30pm

Computational concepts for shell structures, Session 47 Part I; Room 2-105
The modeling and control of chaos in systems of industrial importance, Session 50 Part I; Room 2-132
Advances in computational dynamics, Session 82 Part I; Room 2-135
Inelastic constitutive behavior: micro-macro and phenomenological models, Session 38 Part I; Room 2-136
Advances and applications of computational methods in aerospace, Session 4 Part I; Room 2-139
Frontier of multi-phase flow analysis and fluid-structure interaction, Session 92 Part I; Room 2-142
Uncertainties in structural mechanics/analysis, Session 71 Part I; Room 2-143
Numerical approximation of fluid-structure interaction problems, Session 9 Part I; Room 2-146
Advances in boundary element methods, Session 79 Part I, Room 2-147
Computational models in biology, Session 42 Part I, Room 4-370
Advanced applications in computational fluid and solid mechanics with established software, Session 121 Part I; Room 10-250
Innovative methods in optimal design and control, Session 58 Part I; Room 26-204
Innovative numerical methods, Session 103 Part I; Room 26-210
Soft Tissue Simulation, Session 17; Room 26-302
Probabilistic mechanics and structural reliability, Session 24 Part I; Room 26-310
Computational geomechanics, Session 72 Part I; Room 35-225
Incompressible flow simulations, Session 35 Part I; Room 66-144
Combustion modeling, Session 7 Part I; Room 66-154
Computation of multiphase flows, Session 37 Part I; Room 66-156
Nonlinear dynamics of continuous fluid-structural systems, Session 20 Part I: Room 66-160
Vortex and particle methods, Session 29 Part I; Room 66-168

Tuesday 2:00 - 4:00pm; 4:30pm - End

Computational concepts for shell structures, Session 47 Part II; Room 2-105
The modeling and control of chaos in systems of industrial importance, Session 50 Part II; Room 2-132
Advances in computational dynamics, Session 82 Part II; Room 2-135
Inelastic constitutive behavior: micro-macro and phenomenological models, Session 38 Part II; Room 2-136
Advances and applications of computational methods in aerospace, Session 4 Part II; Room 2-139
Frontier of multi-phase flow analysis and fluid-structure interaction, Session 92 Part II; Room 2-142
Uncertainties in structural mechanics/analysis, Session 71 Part II; Room 2-143
Numerical approximation of fluid-structure interaction problems, Session 9 Part II; Room 2-146
Advances in boundary element methods, Session 79 Part II, Room 2-147
Computational models in biology, Session 42 Part II, Room 4-370
Advanced applications in computational fluid and solid mechanics with established software, Session 121 Part II; Room 10-250
Innovative methods in optimal design and control, Session 58 Part II; Room 26-204
Innovative numerical methods, Session 103 Part II; Room 26-210
Meshless methods, Session 16 Part I; Room 26-302
Probabilistic mechanics and structural reliability, Session 24 Part II; Room 26-310
Pre-conditioned iterative methods and algorithms, applications and software environments, Session 32: Room 26-314
Unstructured mesh adaptation, Session 25: Room 26-322
Computational structural mechanics research in the Department of Defense, Session 5: Room 26-328
Computational geomechanics, Session 72 Part II; Room 35-225
Incompressible flow simulations, Session 35 Part II; Room 66-144
Combustion modeling, Session 7 Part II; Room 66-154
Computation of multiphase flows, Session 37 Part II; Room 66-156
Nonlinear dynamics of continuous fluid-structural systems, Session 20 Part II: Room 66-160
Vortex and particle methods, Session 29 Part II; Room 66-168

Wednesday 9:00am

Plenary Lectures
Chairperson: D. Chapelle

9:00 - 10:30am

Room: Kresge Auditorium (W16)

Nonlinear Schemes and Multiscale Preconditioners for Time Evolution Problems in Constrained Structural Dynamics
P. Le Tallec, École Polytechnique

Steel Industry; Simulation of Production Processes and Product Performance Evaluation using Finite Element Models
E.N. Dvorkin, FUDETEC

10:30 - 11:00am
Coffee Break

Wednesday 11:00am - 12:30pm

Computational concepts for shell structures, Session 47 Part III; Room 2-105
Advances in computational dynamics, Session 82 Part III; Room 2-135
Advances and applications of computational methods in aerospace, Session 4 Part III; Room 2-139
Uncertainties in structural mechanics/analysis, Session 71 Part III; Room 2-143
Advances in boundary element methods, Session 79 Part III, Room 2-147
Computational models in biology, Session 42 Part III, Room 4-370
Advanced applications in computational fluid and solid mechanics with established software, Session 121 Part III; Room 10-250
Discontinuous Galerkin methods for fluid and solid mechanics, Session 15 Part I: Room 26-204
Innovative numerical methods, Session 103 Part III; Room 26-210
Meshless methods, Session 16 Part II; Room 26-302
Probabilistic mechanics and structural reliability, Session 24 Part III; Room 26-310
Incompressible flow simulations, Session 35 Part III; Room 26-314
Computational geomechanics, Session 72 Part III; Room 35-225
High accuracy compact schemes and their applications to CFD, Session 74 Part I; Room 66-144
Combustion modeling, Session 7 Part III; Room 66-154
Analytical and numerical studies of vortical flows, Session 48 Part I; Room 66-156
Flows with free-surfaces/interfaces, Session 97 Part I; Room 66-160
Fluid-structure interactions, Session 52 Part I; Room 66-168

Wednesday 2:00 - 4:00pm; 4:30pm - End

Computational concepts for shell structures, Session 47 Part IV; Room 2-105
Finite element models for smart structures, Session 28; Room 2-132
Advances in computational dynamics, Session 82 Part IV; Room 2-135
Computational modelling of biological pattern formation, Session 93; Room 2-146
Advances and applications of computational methods in aerospace, Session 4 Part IV; Room 2-139
Modeling and simulation of the electro-mechanical behavior of the heart, Session 13; Room 2-142
Inverse problems from thermal/fluids and solid mechanics applications, Session 59; Room 2-143
Advances in numerical analysis techniques for pavement systems, Session 8; Room 2-146
Advances in boundary element methods, Session 79 Part IV, Room 2-147
Computational models in biology, Session 42 Part IV, Room 4-370
Advanced applications in computational fluid and solid mechanics with established software, Session 121 Part IV; Room 10-250
Discontinuous Galerkin methods for fluid and solid mechanics, Session 15 Part II: Room 26-204
Innovative numerical methods, Session 103 Part IV; Room 26-210
Meshless methods, Session 16 Part III; Room 26-302
Computational damage mechanics in metal forming, Session 67; Room 26-310
Computational models using Trefftz functions, Session 46; Room 26-314
Computational insights in material models, Session 100; Room 26-322
Computational modeling of multiphase and structural composites, Session 41; Room 26-328
Structural optimization, Session 61 Part I; Room 35-225
High accuracy compact schemes and their applications to CFD, Session 74 Part II; Room 66-144
Computational combustion, Session 57; Room 66-154
Analytical and numerical studies of vortical flows, Session 48 Part II; Room 66-156
Flows with free-surfaces/interfaces, Session 97 Part II; Room 66-160
Fluid-structure interactions, Session 52 Part II; Room 66-168

Thursday 9:00am

Plenary Lectures
Chairperson: A. Ghoniem

9:00 - 10:30am

Room: Kresge Auditorium (W16)

A Numerical Method for Large Eddy Simulation in Complex Geometries
P. Moin, Stanford University

Aerodynamic Simulation in Aerospace Industry—Status, Needs and Expectations
H. Rieger and W. Schmidt, DaimlerChrysler AG

10:30 - 11:00am
Coffee Break

Thursday 11:00am - 12:30pm

Models and methods for biological fluid dynamics and related problems with immersed boundaries, Session 88 Part I; Room 2-105
Accurate simulation of crack problems, Session 44 Part I; Room 2-132
Electro-magneto-mechanics of smart material systems and structures, Session 77 Part I; Room 2-135
Computational procedures for biological tissue, Session 45 Part I; Room 4-370
Advanced applications in computational fluid and solid mechanics with established software, Session 121 Part V; Room 10-250
Discontinuous Galerkin methods for fluid and solid mechanics, Session 15 Part III: Room 26-204
Simulation of optimal metal forming processes, Session 94 Part I; Room 26-302
Computational stochastic mechanics, Session 70 Part I; Room 26-310
Molecular methods in mechanics, Session 34 Part I; Room 26-210
Advanced analysis for practical design, Session 26 Part I; Room 26-328
Structural optimization, Session 61 Part II; Room 35-225
Fluid flows in design, Session 51 Part I; Room 66-144
Computation of flow problems with complex rheology, Session 27 Part I; Room 66-154
Recent advances in analysis and numerics for fluid dynamics problems, Session 120 Part I; Room 66-156
Simulation models for environmental systems, Session 76 Part I; Room 66-160
Fluid-structure interactions, Session 52 Part III; Room 66-168

Thursday 2:00 - 4:00pm; 4:30pm - End of scheduled sessions for the day

Models and methods for biological fluid dynamics and related problems with immersed boundaries, Session 88 Part II; Room 2-105
Accurate simulation of crack problems, Session 44 Part II; Room 2-132
Electro-magneto-mechanics of smart material systems and structures, Session 77 Part II; Room 2-135
Mechanics of tumor developments, Session 6; Room 2-136
Modeling experiences in finite element analysis, Session 11; Room 2-139
Bridge structures, Sessio 68; Room 2-142
Computational multiscale modeling of advanced composites, Session 54; Room 2-143
Computational fluid geodynamics, Session 40; Room 2-146
Neural networks and soft methods in computational mechanics, Session 90; Room 2-147
Computational procedures for biological tissue, Session 45 Part II; Room 4-370
Mechanical modeling of soft biological tissue, Session 80 Part I; Room 4-370
Advanced applications in computational fluid and solid mechanics with established software, Session 121 Part VI; Room 10-250
Coupling of geomechanics and fluid flow in porous media, Session 91 Part I; Room 26-204
Molecular methods in mechanics, Session 34 Part II; Room 26-210
Simulation of optimal metal forming processes, Session 94 Part I; Room 26-302
Computational stochastic mechanics, Session 70 Part II; Room 26-310
Computational micromechanics of biological materials, Session 84; Room 26-314
Multiscale computations in fluid and solid mechanics, Session 19; Room 26-322
Advanced analysis for practical design, Session 26 Part II; Room 26-328
Multiscale material modeling and simulation, Session 66 Part I; Room 35-225
Fluid flows in design, Session 51 Part II; Room 66-144
Computation of flow problems with complex rheology, Session 27 Part II; Room 66-154
Recent advances in analysis and numerics for fluid dynamics problems, Session 120 Part II; Room 66-156
Simulation models for environmental systems, Session 76 Part II; Room 66-160
Fluid-structure interactions, Session 52 Part IV; Room 66-168

Thursday 7:00 - 9:00pm

Plenary Panel Discussion

7:00 - 9:00pm

Room: 10-250

Providing Virtual Product Development Capabilities for Industry: The Human Element

Chairperson: Steve M. Rohde, Quantum Signal, LLC

Panelists: Edward Arlin, President, Global GM Account, EDS PLM Solutions
Don Brown, Chairman, D.H. Brown Associates
Elaine Chapman-Moore, Manager of PACE Partnerships, General Motors
Lorna Estep, Executive Director of the Headquarters Material Systems Group (MSG), USAF
Ronald Rosenberg, Associate Dean, Michigan State University
Reza Sadeghi, Senior Director, MSC Software
John Tichy, Mechanical, Aerospace, & Nuclear Engineering Department Chair, Rensselaer Polytechnic Institute
Dave Wallace, Professor, MIT

Friday 9:00am

Plenary Lectures
Chairperson: N.G. Hadjiconstantinou

9:00 - 10:30am

Room: Kresge Auditorium (W16)

Simulations of Complex Systems across Multiple Length Scales
E. Kaxiras, Harvard University

Consequences of Modeling on Tire Development
J.-M. Vacherand, Michelin

10:30 - 11:00am
Coffee Break

Friday 11:00am - 12:30pm

Crash and crush safety, Session 18 Part I; Room 2-105
Determination of stress intensity factors, Session 43 Part I; Room 2-132
Educational issues and aspects for computational fluid and solid mechanics, Session 81 Part I; Room 2-135
Research scientific software for partial differential equations, Session 65 Part I; Room 2-136
Differential quadrature, generalized methods and related discrete element analysis methods, Session 14 Part I; Room 2-139
Nonlinear time-history of long span seismic bridge design and retrofit, Session 73 Part I; Room 2-142
Advanced analysis of concrete structures, Session 98 Part I; Room 2-143
Methods of analysis for contact problems, Session 101 Part I; Room 2-147
Error prediction/control in FEM, Session 104 Part I; Room 2-147
Mechanical modeling of soft biological tissue, Session 80 Part II; Room 4-370
Advanced applications in computational fluid and solid mechanics with established software, Session 121 Part VII; Room 10-250
Coupling of geomechanics and fluid flow in porous media, Session 91 Part II; Room 26-204
Microfluidics and BioMEMS simulation, Session 49 Part I; Room 26-210
Simulation of optimal metal forming processes, Session 94 Part II; Room 26-302
Stochastic simulation methods for optimization problems, Session 22 Part I; Room 26-310
Kinetic and fluid models for rarified and ionized media, Session 3 Part I; Room 26-314
Multi-scale methods, Session 1 Part I; Room 26-322
Computational stochastic mechanics, Session 70 Part III; Room 26-328
Multiscale material modeling and simulation, Session 66 Part II; Room 35-225
Fluid flows in design, Session 51 Part III; Room 66-144
Arbitrary Lagrangian-Eulerian methods in computational fluid dynamics and computational solid dynamics, Session 63 Part I; Room 66-156
Simulation models for environmental systems, Session 76 Part I; Room 66-160
Recent advances in high-order methods, Session 23 Part I; Room 66-168

Friday 2:00 - 4:00pm

Crash and crush safety, Session 18 Part II; Room 2-105
Determination of stress intensity factors, Session 43 Part II; Room 2-132
Educational issues and aspects for computational fluid and solid mechanics, Session 81 Part II; Room 2-135
Research scientific software for partial differential equations, Session 65 Part II; Room 2-136
Differential quadrature, generalized methods and related discrete element analysis methods, Session 14 Part II; Room 2-139
Nonlinear time-history of long span seismic bridge design and retrofit, Session 73 Part II; Room 2-142
Advanced analysis of concrete structures, Session 98 Part II; Room 2-143
Methods of analysis for contact problems, Session 101 Part II; Room 2-147
Error prediction/control in FEM, Session 104 Part II; Room 2-147
Mechanical modeling of soft biological tissue, Session 80 Part III; Room 4-370
Advanced applications in computational fluid and solid mechanics with established software, Session 121 Part VIII; Room 10-250
Microfluidics and BioMEMS simulation, Session 49 Part II; Room 26-210
Stochastic simulation methods for optimization problems, Session 22 Part II; Room 26-310
Kinetic and fluid models for rarified and ionized media, Session 3 Part II; Room 26-314
Multi-scale methods, Session 1 Part II; Room 26-322
Multiscale material modeling and simulation, Session 66 Part III; Room 35-225
Fluid flows in design, Session 51 Part IV; Room 66-144
Arbitrary Lagrangian-Eulerian methods in computational fluid dynamics and computational solid dynamics, Session 63 Part II; Room 66-156
Simulation models for environmental systems, Session 76 Part II; Room 66-160
Recent advances in high-order methods, Session 23 Part II; Room 66-168

End of Conference

List of Sessions - with Details

This section contains the following information in this order:

- Index to Sessions, arranged by Session Number
- Room Allocations for Sessions, denoted by Session Number
- Session Details arranged by increasing order of Session Number (not by date or time), with Room, Presentations and Time scheduled for each Presentation

The Chronological Time Schedule will be available in hard copy at the Conference.

Each presentation is scheduled to start at the hour or the half hour, and is to last 25 minutes.
Lunch is scheduled daily from 12:30-2:00pm.
Sessions held in the afternoon include a Coffee Break from 4:00-4:30pm.

Index to Sessions

In the following sessions, more than 800 presentations are scheduled. Each 25-minute presentation is scheduled to start at the hour or the half hour.

The index is arranged in increasing, but not consecutive, order of session number from 1 to 121. Some sessions from the original list were combined with others, which accounts for the apparent gaps in the numbering.

Room Allocations

The bold numbers in the table are Session Numbers.

*The Plenary Panel Discussion will be held in Room 10-250 on Thursday, June 19, from 7:00 - 9:00pm.

	Tuesday, June 17		Wednesday, June 18		Thursday, June 19		Friday, June 20	
Room No.	am	pm	am	pm	am	pm	am	pm
2-105	**47**	**47**	**47**	**47**	**88**	**88**	**18**	**18**
2-132	**50**	**50**		**28**	**44**	**44**	**43**	**43**
2-135	**82**	**82**	**82**	**82**	**77**	**77**	**81**	**81**
2-136	**38**	**38**		**93**		**6**	**65**	**65**
2-139	**4**	**4**	**4**	**4**		**11**	**14**	**14**
2-142	**92**	**92**		**13**		**68**	**73**	**73**
2-143	**71**	**71**	**71**	**59**		**54**	**98**	**98**
2-146	**9**	**9**		**8**		**40**	**101**	**101**
2-147	**79**	**79**	**79**	**79**		**90**	**104**	**104**
4-370	**42**	**42**	**42**	**42**	**45**	**45, 80**	**80**	**80**
10-250	**121**	**121**	**121**	**121**	**121**	**121***	**121**	**121**
26-204	**58**	**58**	**15**	**15**	**15**	**91**	**91**	
26-210	**103**	**103**	**103**	**103**		**34**	**49**	**49**
26-302	**17**	**16**	**16**	**16**	**94**	**94**	**94**	
26-310	**24**	**24**	**24**	**67**	**70**	**70**	**22**	**22**
26-314		**32**	**35**	**46**	**34**	**84**	**3**	**3**
26-322		**25**		**100**		**19**	**1**	**1**
26-328		**5**		**41**	**26**	**26**	**70**	
35-225	**72**	**72**	**72**	**61**	**61**	**66**	**66**	**66**
66-144	**35**	**35**	**74**	**74**	**51**	**51**	**51**	**51**
66-154	**7**	**7**	**7**	**57**	**27**	**27**		
66-156	**37**	**37**	**48**	**48**	**120**	**120**	**63**	**63**
66-160	**20**	**20**	**97**	**97**	**76**	**76**	**76**	**76**
66-168	**29**	**29**	**52**	**52**	**52**	**52**	**23**	**23**

1 - Multi-scale methods

Chairpersons: K. Amaratunga and D. Veneziano
Room: 26-322

Friday 11:00am – 12:30pm

Multiscale numerical simulation of rock slope instabilities
M. Borri-Brunetto and B. Chiaia

Towards a continuum theory for phase transformations using atomistic calculations
M.G.A. Tijssens and R.D. James

Adaptive wavelet Galerkin BEM
H. Harbrecht and R. Schneider

Friday 2:00 - 4:00pm

A multiresolution finite element method using second generation Hermite multiwavelets
R. Sudarshan, S. D'Heedene and K. Amaratunga

Linear elasticity with isotropic lognormal Young's modulus: localization of stresses and strains and effective stiffness tensor
D. Veneziano

Macro-meso models for joint submitted to pyrotechnic shock
P.-A Boucard, M. Dérumaux, P. Ladevèze and Ph. Roux

Coupling 1D and 2D elasticity problems by using the *hp-d*-version of the finite element method
A. Niggl, A. Düster and E. Rank

3 - Kinetic and fluid models for rarified and ionized media

Chairpersons: O. Batishchev and E. Son
Room: 26-314

Friday 11:00am – 12:30pm

A new deterministic numerical method for the Boltzmann equation
S. Rjasanow

An efficient statistical noise-free kinetic method for collisional rarified gas simulations
O. Batishchev and A. Batishcheva

Semiempirical theory and computer simulation of turbulent combustion of fuels with liquid and metal particles
E. Son, A. Zibarov and D. Patrikeev

Friday 2:00 - 4:00pm

On the dependence of the Navier-Stokes equations on the distribution of molecular velocities
P.J. Love

Modeling of plasma processes in low-power Hall thruster using 1-D stationary fluid model
S.V. Irishkov

Multilevel resolution of the two-phase reacting flow in a tube with application to Al_2O_3 CVD-reactor
A.A. Markov and A. Sadiki

A new approach to numerical solution of Riemann problem for ideal MHD equations
Y.A. Kholodov

4 - Advances and applications of computational methods in aerospace

Chairpersons: J. Bayandor and D. Hachenberg
Room: 2-139
**denotes key-note presentations*

Tuesday 11:00am – 12:30pm

***A statistical model of laminar-turbulent transition**
R. Rubinstein

The effect of vertical atmospheric turbulence velocity on the sensitivity analysis to a forced landing manoeuvre
P. Tong, C. Bil and G. Galanis

Tuesday 2:00 – 4:00pm

***Adjoint methods for aerodynamic shape optimization**
A. Jameson and L. Martinelli

Computational method to simulate planned ditching of a transport airplane
L. Bensch, V. Shigunov and H. Söding

A preliminary study of wing loads system identification using artificial neural networks
K.C. Hsu

Understanding the flying toroidal wing
A. Carryer and M. Austin

Tuesday 4:30pm – End

***Polynanomeress: a composite framework for nanotechnology**
J.C. Seferis

Voxel modelling of 3-D through-thickness reinforced composite laminates
A.J. Gunnion, M.L. Scott and R.S. Thomson

Progressive damage analysis of single-lap composite bolted joints
C.T. McCarthy and M.A. McCarthy

Conceptual optimization of a fibre composite aircraft spoiler
M. Nguyen and C. McMahon

Wednesday 11:00am – 12:30pm

***Modeling of microscale combustion for power generation and propulsion**
P.D. Ronney

Parallel solution-adaptive method for compressible flows through turbomachinery
C.P.T. Groth

***Pronounced unsteady flow control for highly efficient turbulence energy exploitation**
J. Bayandor

Wednsday 2:00 – 4:00pm

***Requirements for advanced computational methods used in development of future aircraft composite structures**
D. Hachenberg

Identification of parameters for a rate and temperature dependent constitutive model
B. Elliott, N. Petrinic and L. Wang

Optimum aerospace composite control surface design
J. Bayandor, M.L. Scott and R.S. Thomson

Higher order aerothermoelastic loading model for hypersonic skin panel
S.A. Fazelzadeh and S.H. Pourtakdoust

Wednesday 4:30pm – End

Computational asymmetric Lamb wave models for localization of acoustic emission sources and damage indicators for delaminations detection in laminated composites
A. Ghoshal and H. Kim

5 - Computational structural mechanics research in the Department of Defense

Chairpersons : J.T. Baylot and R. Löhner
Room: 26-328
**denotes key-note presentation*

Tuesday 2:00 – 4:00 pm

***Overview of computational structural mechanics in the Department of Defense**
R.L. Hall and J.T. Baylot

Using coupled fluid/structure interaction code to predict fighter aircraft wing response to AAA damage
R.L. Hinrichsen and M.A. Moshier

Coupling of discrete particle model with embedded mesh flow solver
C.M. Charman, D. Pelessone, R. Löhner and J.D. Baum

Convergence study for the discrete particle method
D. Pelessone, J.D. Baum , R. Löhner, C.M. Charman and J.T. Baylot

Tuesday 4:30pm – End
Co-Chair: Y.G. Sohn

Structure-medium-interaction simulations
S.A. Akers and J.E. Windham

Modeling contact detonations with ALE3D and PARADYN
J.L. O'Daniel

Simulation of projectile impact on the composite armored vehicle
P.P. Papados

Expedient FE analysis of concrete masonry walls subjected to blast loads
C.D. Eamon, J.T. Baylot and J.L. O'Daniel

Parallel computation methods for large-scale nonlinear CSM
K.T. Danielson, S.A. Akers and M.D. Adley

6 - Mechanics of tumor developments

Chairpersons: N. Bellomo and R.P. Araujo
Room: 2-136

Thursday 2:00 – 4:00pm

An anisotropic model of vascular tumor growth: implications for vascular collapse
R.P. Araujo and D.L.S. McElwain

Numerical simulation of the growth of a multicellular spheroid
D. Ambrosi and F. Mollica

A mathematical model of immune response to tumor invasion
L.G. de Pillis and A. Radunskaya

Modelling the dynamics of tumour cords under a cell killing agent
A. Bertuzzi, A. Fasano and A. Gandolfi

Thursday 4:30pm - End

Tumour angiogenesis and cell motion
B.D. Sleeman

7 - Combustion modeling

Chairpersons: A.C. Benim and J. Grcar
Room: 66-154

Tuesday 11:00am – 12:30pm

Investigation into the fluid dynamics of a droplet in gas flow
A.C. Benim and M. Cagan

CFD studies for boilers
R. Leithner and H. Müller

CFD modeling in process burner development – combustion of light residual fuel oils
F.K. Jäger and H. Köhne

Tuesday 2:00 – 4:00pm
Session: *Large-scale scientific computing of 3-D combustion with a minimum of subgrid modeling*
Chairpersons: J. Grcar and A.C. Benim

Simulation of pollutant emission near lean-blowout in gas turbine engines
S. Menon, G. Eggenspeiler and I. Porumbel

Large-Eddy simulation of premixed turbulent combustion
H. Pitsch, L. D. de Lageneste

Numerical simulation of premixed turbulent methane combustion
J.B. Bell, M.S. Day, A.S. Almgren, R.K. Cheng and I.G. Shepherd

Direct simulations of three-dimensional turbulent premixed flames
D. Thévenin

Tuesday 4:30pm – End

CFD based prediction of a turbulent nonpremixed methane flame using a conditional moment closure approach
C. Mueller

A presumed PDF-ILDM model for the CFD-analysis of turbulent combustion
J.C. Ferreira, R. Bender and H. Forkel

Assumed PDF modelling for combustion in high speed flows
P. Gerlinger, B. Noll and M. Aigner

A comparison of the Bader-Deuflhard and the Cash-Karp Runge-Kutta integrators for the GRI-MECH 3.0 model based on the chemical kinetics code Kintecus
J.C. Ianni

Wednesday 11:00am – 12:30pm

On the modeling of diffusion processes in detailed chemistry post-processing for CFD
T. Zschunke, U. Sénéchal, M. Neumann and W.E. Nagel

Applications of exponential box schemes for viscous flows with combustion and blowing
V.V. Riabov

EUPAC: Eulerian-eulerian modeling of pulverized coal combustion
B. Epple and A.C. Benim

8 - Advances in numerical analysis techniques for pavement systems

Chairpersons: B. Birgisson and H.C. Chung
Room: 2-146

Wednesday 2:00 – 4:00pm

Effects of vehicle speed and permeability on pore pressures in hot mix asphalt pavements
M.E. Novak, B. Birgisson and M. McVay

Application of graded finite elements for asphalt pavement analysis
W.G. Buttlar, G.H. Paulino and S.H. Song

Gradient elasticity finite element model for the microstructure analysis of asphaltic materials
S. Dessouky, E. Masad, H. Zbib and D. Little

Wednesday 4:30pm – End

Near-surface stress states in flexible pavement using measured radial tire contact stresses and ADINA
M. Novak, B. Birgisson, R.Roque

GIS-based automated management of pavement inspection system (AMPIS)
H.C. Chung and M. Shinozuka

9 - Numerical approximation of fluid-structure interaction problems

Chairpersons: D. Boffi and L. Gastaldi
Room: 2-146
**denotes key-note presentation*

Tuesday 11:00am – 12:30pm

***Modeling a cell passing through a stenotic channel using extended immersed boundary method**
J. Zhu and X. Wang

The immersed boundary method: a finite element approach
D. Boffi and L. Gastaldi

Acceleration of a fixed pint algorithm for fluid-structure interaction using transpiration conditions
S. Deparis, M.A. Fernandez, L. Formaggia and F. Nobile

Tuesday 2:00 – 4:00pm

Aeroelastic simulation of a tilt-rotor considering the non-linear effects of the transmission design
C.L. Bottasso

Computation of the vibration modes of an elastoacoustic system using a modal synthesis method
A. Bermúdez, L. Hervella-Nieto and R. Rodríguez

Efficient solution procedures for the simulation of fluid-structure interaction problems
S. Meynen and M. Schäfer

Numerical simulation of a guitar
E. Bécache, A. Chaigne, G. Derveaux and P. Joly

Tuesday 4:30pm – End

Recent development of fluid-structure-interaction capabilities in the ADINA system
H. Zhang, X. Zhang, S. Ji, Y. Guo, G. Ledezma, N. Elabbasi, H. deCougny

11 - Modeling experiences in finite element analysis

Chairpersons: M.L. Bucalem and J.W. Bull
Room: 2-139

Thursday 2:00 – 4:00pm

Reliability considerations for 3D-shell elements
D. Chapelle and A. Ferent

Locking-free piezoelectric MITC shell elements
M. Kögl and M.L. Bucalem

Thermo-elasto-plastic finite element modeling of an Otto four stroke engine piston for consecutive load cycles
E.M.R. Bueno, M.L. Bucalem, C.H. Furukawa, C.B. Zabeu and L.M.V. Lopez

Structural degradation of wind-turbine towers under combined wind and thermic action
R. Wörmann and R. Harte

Thursday 4:30pm - End

Large-scale finite element analyses of intersecting tunnels using PC
S.H. Chan, K.K. Phoon and F.H. Lee

Elasto-plastic torsion of composite bars with imperfect bonding
G. Mejak

Effect of ladder-frame on FE analysis of bulkhead/main bearing cap strcuture
K.-W. Lee, H. Chang and K.-H. Park

Numerical investigation of the deformation of a ground station antenna (ESA)
T. Bornkessel and M. Schäfer

Displacement and fatigue effects of a void under a cement concrete runway
J.W. Bull

13 - Modeling and simulation of the electro-mechanical behavior of the heart

Chairpersons: D. Chapelle and D. Tang
Room: 2-142

Wednesday 2:00 – 4:00pm

A nonlinearly elastic homogenized constitutive law for the myocardium
A. Mourad, D. Caillerie and A. Raoult

Unstructured finite element method for a 3-D anisotropic bidomain model
Y. Bourgault and M. Ethier

Data assimilation for an electro-mechanical model of the myocardium
J. Sainte-Marie, D. Chapelle and M. Sorine

Modelling heart tissue using a composite muscle model with blood perfusion
R. Cimrman and E. Rohan

Wednesday 4:30pm - End

Positron emission tomography-based computational modeling of oxygen consumption in the heart
F. Yan and D. Tang

14 - Differential quadrature, generalized methods and related discrete element analysis methods

Chairpersons: C.-N. Chen and K.K. Phoon
Room: 2-139
**denotes key-note presentation*

Friday 11:00am – 12:30pm

***Transient response analyses by extended generic differential quadratures based discrete element analysis methods and time integration schemes**
C.-N. Chen

Generalized differential quadrature method for Timoshenko beam
M. Mestrovic

Equivalence between spectral and finite elements matrices
M. Ribot and M Schatzman

Friday 2:00 – 4:00pm

Interactions between strip and beam elements of a hollow block slab system
M.A. Ghadeer, J. Ye and A.H. Mansouri

Application of WENO (weighted essentially non-oscillatory) method to computational aerodynamics
B. Epstein and S. Peigin

15 - Discontinuous Galerkin methods for fluid and solid mechanics

Chairpersons: B. Cockburn, C. W. Shu and S. Adjerid
Room: 26-204

Wednesday 11:00 – 12:30pm
Chairperson: S. Adjerid

Local discontinuous Galerkin methods for incompressible flow
D. Schötzau

Shallow water modeling using discontinuous and coupled finite element methods
C. Dawson, D. Pothina and J. Proft

Space-time discontinuous Galerkin finite element method for inviscid gas dynamics
H. van der Ven, J.J.W. van der Vegt and E.G. Bouwman

Wednesday 2:00 – 4:00pm
Chairperson: D. Schötzau

Discontinuous Galerkin finite element solution of 3D elasticity
M.F. Wheeler and R.J. Liu

Mixed methods for interface problems
C. Lovadina, R Nascimbene, I. Perugia and P. Venini

A generalized quadrature free discontinuous Galerkin method
P. Rao and P.J. Morris

Discontinuous Galerkin methods for equations with divergence-free solutions: preliminary results
B. Cockburn, F. Li and C.-W. Shu

Wednesday 4:30pm - End
Chairperson: I. Perugia

Application of unified DG analysis to preconditioning DG methods
J. Gopalakrishnan and G. Kanschat

Preconditioning discontinuous Galerkin saddle point systems
G. Kanschat

Flexible Galerkin finite element methods
S. Adjerid and T.C. Massey

Thursday 11:00am – 12:30pm
Chairperson: B. Cockburn

Effective implementation of a time discontinuous Galerkin method
M. Mancuso and F. Ubertini

High-order localized time integration for grid-induced stiffness
C. Chauviere, J.S. Hesthaven, A. Kanevsky and T. Warburton

16 - Meshless methods

Chairpersons: S. De, S.R. Idelsohn, J. Orkisz, J.-W. Hong, H. Noguchi, J. Krok and P.Villon
Room: 26-302
**denotes key-note presentation*

Tuesday 2:00 – 4:00pm

Orthotropic plate dynamics by a novel meshfree method
I. Benedetti, G. Davì and A. Milazzo

Treatment of boundary conditions in corrective smoothed particle method heat conduction problems
M.P. Hoffman, T.L. Mazely and R. Yazzie

On the use of radial basis functions in a local weighted meshless method
J.R. Xiao and M.A. McCarthy

Tuesday 4:30pm – End

***A Lagrangian meshless finite element method applied to fluid-structure interaction problems**
F. Del Pin, S.R. Idelsohn, and E. Oñate

Dynamic fracture modeling with a meshfree peridynamic code
S.A. Silling

Mesh-less method for homogeneous handling of fiber-fluid interactions
N. Marheineke

The material point method in analysis of problem of shear bounds formation
Z. Więckowski

Wednesday 11:00am – 12:30pm

***Analysis of structure with material interface by meshfree method**
H. Noguchi and Y. Sato

Optimal shapes for natural convection cooled thermal fins: a meshfree approach to inverse optimal design
F. Bobaru and S. Rachakonda

Pseudo-divergence-free element free Galerkin method for incompressible fluid flow
Y. Vidal and A. Huerta

Wednesday 2:00 – 4:00pm

***A mesh generator for an adaptive multigrid MFD/FE method**
J. Orkisz, P. Przybylski and I. Jaworska

Multiscale analysis on fluids and fluid-structure interactions using FEM and meshfree methods
L. Zhang, Z. Gerstenberger, X.D. Wang and W.K. Liu

On analytical transformations for efficiency requirements in the method of finite spheres
J.-W. Hong and K.J. Bathe

Numerical modeling of porous materials mechanical behaviour with the cell method
F. Cosmi

Wednesday 4:30pm – End

***Custom integration scheme for patch test in MLS meshfree methods**
P. Breitkopf, A. Rassineux and P. Villon

A meshless FDM applied to a posteriori error analysis of experimental data by physically based global method approximation
J. Magiera

Meshless FDM-based approach to error control and evaluation of experimental or numerical data
J. Krok

A dual particle meshfree method
L.D. Libersky

17 - Soft Tissue Simulation

Chairpersons: S. De and S. Socrate
Room: 26-302

Tuesday 11:00am – 12:30pm

Relative stiffness imaging in biological tissue
D. Renzi and J. Mclauglin

Aspects of the formulation of hyperelastic soft tissues with polyconvex anisotropic energies
J. Schröder and P. Neff

18 - Crash and crush safety

Chairpersons: Y.-C. Deng and M. Bossak
Room: 2-105

Friday 11:00am – 12:30pm

Advancing crash forming analysis capabilities through solver technology
O. Schenk and M. Selig

Development of a crashworthy subfloor concept for a commuter aircraft
C. Bisagni

High-speed impact of liquid-filled circular tubes
L. Xue and T. Wierzbicki

Friday 2:00 – 4:00pm

Phenomenological modelling of structural embrittlement in perforated plates
A.-S. Bayart, B. Langrand, E. Deletombe, E. Markiewicz and P. Drazétic

Finite element model of the torso of the crash test dummy THOR
H. Yu, Q. Zhou, M. Medri and F. DiMasi

A study on determining the strength criterion of impacts for suspension parts of a vehicle
H.-G. Kim, J.W. Jeon and K.-H. Park

Global/local analysis of composite light aircraft crash landing
M. Bossak and J. Kaczkowski

19 - Multiscale computations in fluid and solid mechanics

Chairpersons: B. Diskin and B. Wade
Room: 26-322

Thursday 2:00 – 4:00pm

Multiscale computation: from fast solvers to systematic uspscaling
A. Brandt

From deterministic curvature driven grain growth to stochastic models
S. Ta'asan, I. Livshits and D. Kinderlehrer

Nonlinear Schwarz-FAS methods for unstructured finite element elliptic problems
J.E. Jones, P.S. Vassilevski and C.S. Woodward

Thursday 4:30pm - End

Remarks on the wave-ray multigrid solvers for Helmholtz equations
A. Brandt and I. Livshits

Analysis of a pointwise smoother in multigrid for poroelasticity
R. Wienands, F.J. Gaspar, F.J. Lisbona and C.W. Oosterlee

A multigrid algorithm for the incompressible Navier-Stokes equations
R.C. Swanson, J.L. Thomas and T.W. Roberts

Textbook multigrid efficiency: stagnation flows
J.L. Thomas, B. Diskin and R.E. Mineck

Multigrid for data assimilation: analysis
R. Gandlin and A. Brandt

20 - Nonlinear dynamics of continuous fluid-structural systems

Chairpersons: E.H. Dowell, M. Amabili, B.I. Epureanu and F. Pellicano
Room: 66-160
**denotes key-note presentations*

Tuesday 11:00am – 12:30pm

***Nonlinear vibrations of shells: compact model using the proper orthogonal decomposition method**
M. Amabili, A. Sarkar and M.P. Païdoussis

Non-linear oscillations of continuous systems with quadratic and cubic non-linearities using non-linear normal modes
C. Touzé, O. Thomas and A. Chaigne

The application of spring pendulum analogies to the understanding of nonlinear shell vibration
A.A. Popov

Tuesday 2:00 – 4:00pm

Nonlinear vibrations of circular cylindrical panels
M. Amabili and M. Pellegrini

Nonlinear dynamics and stability of compressed circular cylindrical shells
F. Pellicano and M. Amabili

Post-flutter dynamics of a rotating disk
A. Raman, M.H. Hansen and C.D. Mote, Jr.

Proper orthogonal decomposition of by-pass transition data
S. De and T.K. Sengupta

Tuesday 4:30pm - End

***Observations of the dynamics of panels in supersonic flow**
B.I. Epureanu, L.S. Tang and M.P. Paidoussis

Analytical-numerical models for flutter of cylindrical shells in supersonic flow
E.L. Jansen

22 - Stochastic simulation methods for optimization problems

Chairpersons: F. Duddeck, L. Willmes and T. Bäck
Room: 26-310

Friday 11:00am – 12:30pm

***Stochastic methods for optimization of crash and NVH problems**
F. Duddeck D. Heiserer and J. Lescheticky

Evolution strategies for engineering design optimization
L. Willmes and T. Bäck

Parametric design improvement strategies using long running simulation codes
H. Wenzel and J. Remenec

Friday 2:00 – 4:00pm

High performance computing for multidisciplinary design optimization and robustness of vehicle structures
S. Kodiyalam

Experience with sequential stochastic design improvement methods
R.J. Yang, L. Gu, Y. Fu and C.-H. Tho

Optimization of a reconstructed middle ear using an evolution strategy
C. Breuninger, F. Dignath, P. Eberhard and L. Kübler

23 - Recent advances in high-order methods

Chairpersons: P. Fischer and Y. Maday
Room: 66-168

Friday 11:00am - 12:30pm

Numerical methods for the simulation of viscoelastic flows using high-order methods
C. Chauviére

High-order radiation boundary conditions for time-domain electromagnetics using an unstructured discontinuous Galerkin method
T. Hagstrom and T. Warburton

The reduced basis element method: basics and a posteriori estimates
Y. Maday

Friday 2:00 - 4:00pm

High order anisotropic finite elements for three-dimensional isotropic hyperelastic continua
A. Düster and S. Hartmann

Development and initial experience with an outcropping isopycnal, unstructured grid ocean model
M. Iskandarani

An *0*(*n log n*) solution algorithm for spectral element methods
I. Lee, P. Raghavan, S. Schofield and P. Fischer

24 - Probabilistic mechanics and structural reliability

Chairpersons: F. Biondini and K.K. Phoon
Room: 26-310
**denotes key-note presentation*

Tuesday 11:00am – 12:30pm

***Reliability of material and geometrically nonlinear reinforced and prestressed concrete structures**
F. Biondini, F. Bontempi and D.M. Frangopol

Quasi-steady analysis of a two-dimensional bridge deck element
C. Borri and C. Costa

Tuesday 2:00 – 4:00pm

Comparison between the Karhunen-Loeve and wavelet expansion for simulation of Gaussian processes
K.K. Phoon, H.W. Huang and S.T. Quek

Stochastic solution approximation for high-complexity problems
D.M. Ghiocel

Fuzzy based approach for the reliability assessment of reinforced concrete two-blade slender bridge piers using three-dimensional non-linear analysis
L. Sgambi

Reliability structural assessment of concrete structures using genetic algorithms and nonlinear analysis
L. Catallo

Tuesday 4:30pm – End

Risk-based condition assessment and maintenance engineering
D.M. Ghiocel

Cost of reliability improvement and deterioration delay of maintained structures
L.C. Neves, D.M. Frangopol and P.S. Cruz

Stochastic analysis of concrete structures
A. Strauss, K. Bergmeister,U. Santa, R. Pukl, V. Červenka and D. Novák

Wednesday 11:00am – 12:30pm

Reliability analysis of advanced FEM performed elastic-plastic structures by response surface method
G. Bielawski, M. Kleiber, J. Knabel, J. Rojek and A. Siemaszko

Calculation of the soil-based bases with variable strain modulus
B. Abdusattor

Use of the response surface method in structural and reliability analysis and optimization
J. Menčík

25 - Unstructured mesh adaptation

Chairpersons: P.J. Frey and A. Perronnet
Room: 26-322

Tuesday 2:00 – 4:00pm

Transient adaptive discontinuous Galerkin method with anisotropic meshes
J.-F. Remacle

Anisotropic mesh adaptation method for computational mechanics problems
V. Dolejší

Controlling approximation error in 3D
J. Dompierre, P. Labbé and F. Guibault

Anisotropic metrics for mesh adaptation
P.J. Frey and F. Alauzet

Tuesday 4:30pm - End

Anisotropic mesh adaptation. Applications to transient CFD problems
F. Alauzet, P.J. Frey and B. Mohammadi

Automatic mesh motion in FVM
Z. Tuković and H. Jasak

Development of an adaptive grid method for an ocean general circulation model
A. Herrnstein

NEF: A mesher based on OpenCascade C.A.D. software
A. Perronnet

26 - Advanced analysis for practical design

Chairpersons: C. Gantes and D.L. Karabalis
Room: 26-328
**denotes key-note presentation*

Thursday 11:00am – 12:30pm

Precise lateral bending analysis of thin-walled beams with branched cross-sections
M. Hýča

Numerical analysis of simple and preloaded T-stub steel connections
M.E. Lemonis and C.J. Gantes

Ultimate compressive strength of CHS members with flattened edges
E.S. Mistakidis

Thursday 2:00 – 4:00pm

3-D prestressed ring joints subjected to bending loads
D.L. Karabalis and N.D. Stathopoulos

Design analysis of the support structure stressed by large superconducting coils for a plasma fusion experiment
N. Jaksic and J. Simon-Weidner

Modeling the structural dynamic response of overhead transmission lines
G. McClure and M. Lapointe

Nonlinear analysis of barge crush behavior and its relationship to impact resistant bridge design
G. R. Consolazio and D. R. Cowan

Thursday 4:30pm - End

***Response of concrete armor units to wave induced impact**
J.W. Tedesco, W.G. McDougal, D. Bloomquist and G. R. Consolazio

***Response of concrete armor units to wave-induced hydrodynamic loads**
J.W. Tedesco, W.G. McDougal, D. Bloomquist and L.A. Wise

Calculation of the soil-based bases with variable strain modulus

B. Abdusattor

27 - Computation of flow problems with complex rheology

Chairpersons: D. Gartling and A.M. Grillet
Room: 66-154
**denotes keynote presentation*

Thursday 11:00am – 12:30pm

***Computing transient viscoelastic flows**
R.I. Tanner and S.-C. Xue

Time-dependent algorithm: bridge between finite volume and finite element
M. Aboubacar, H.R. Tamaddon-Jahromi and M.F. Webster

The importance of assessing the stability predictions of polymer melt constitutive equations
A.M. Grillet, A.C.B. Bogaerds and F.P.T. Baaijens

Thursday 2:00 – 4:00pm

The elastic instability of fountain flows
A. Bogaerds, M. Hulsen, G. Peters and F. Baaijens

Recent progress on the modeling of complex flows in twin-screw extrusion
F. Bertrand, R. Giguere and P.A. Tanguy

Numerical modeling of incompressible viscous flows: single crystal growth through heat field rotation method
A.E. Kokh, LA. Mironova and V.N. Popov

Numerical simulation of viscoelastic contraction flows
M.A. Alves, P.J. Oliveira and F.T. Pinho

Thursday 4:30pm – End

Some new semi-Lagrangian scheme for simulating time-dependent visco-elastic flows
Y.-J. Lee

Analysis of confined free boundary viscoelastic flowa with constitutive equations of integral type
G.R. Dias, A.M. Cunha, J. Figueiredo, M. Vincent and T. Coupez

A FEM/VOF hybrid formulation for underfill encapsulation modeling
D. Pantuso, L. Jiang, S. Shankar and S. Skokov

28 - Finite element models for smart structures

Chairpersons: P. Gaudenzi and T.H. Brockmann
Room: 2-132
**denotes key-note presentation*

Wednesday 2:00 – 4:00pm

***Finite beam elements for rotating piezoelectric fiber composite structures**
T.H. Brockmann and R. Lammering

An impedance-based piezoelectric-structure interaction model for smart structure applications
S. Bhalla, A.S.K. Naidu, Y.W. Yang and C.K. Soh

Smart structures models updating
F. Formosa, H. Abou-Kandil and M. Reynier

Finite element modelling of intelligent structures – dynamical behaviour and the shape memory effect
S. Reese

Wednesday 4:30pm – End

Mdof shear frame base isolated by SMA devices
O. Corbi

Aspects of the modelling of nonlinear electro-mechanical coupled ferroelectrica
H. Romanowski and J. Schröder

The electro-elastic analysis of a composite piezoelectric strip with an internal semi-infinite electrode
C.D. Chen and C.H. Chue

Fracture analysis of piezoelectric materials with an arbitrarily oriented crack using energy density theory
C.H. Chue and S.M. Weng

29 - Vortex and particle methods

Chairpersons: A. Ghoniem and J.R. Grant
Room: 66-168

Tuesday 11:00am – 12:30pm

Multi-physics and particle methods
G.-H. Cottet

Vorticity generation mechanisms and correct boundary conditions for transverse jet simulation
Y.M. Marzouk and A. Ghoniem

Toward an arbitrary Lagrangian-Eulerian vorticity transport method
J.S. Marshall

Tuesday 2:00 – 4:00pm

Comparison of regularizations of vortex sheet motion
M. Nitsche, M.A. Taylor and R. Krasny

Calculation of the sound generated by the head-on collision of two vortex rings
J.S. Uhlman

Robust time stepping and boundary condition algorithms for Lagrangian vorticity methods
J.R. Grant

Self sustained oscillations in separating flows: simulation and stability analysis
T. Yi, D. Wee, A. Annaswamy and A. Ghoniem

Tuesday 4:30pm - End

Inlet stream wise vorticity effects on jet evolution and far field sound generation
M. Soteriou, R. Reba and T. Maeder

Open-loop control of three-dimensional wakes
P. Poncet and G.-H. Cottet

Parallel fast solver based on the vortex element method
C.M. Albukrek, A. Batishcheva and A. Ghoniem

Discrete vortex simulation of vortex excitation and mitigation in bridge engineering
A. Larsen and J.H. Walther

32 - Pre-conditioned iterative methods and algorithms, applications and software environments

Chairpersons: G.A. Gravvanis, K.K. Phoon and P. Kettil
Room: 26-314
**denotes key-note presentation*

Tuesday 2:00 – 4:00pm

***On the rate of convergence and complexity of finite element normalized explicit approximate inverse preconditioning**
G.A. Gravvanis and K.M. Giannoutakis

A domain decomposition method for solving the Pennes' bioheat transfer in a 3D triple-layered skin structure
W. Dai, G. Li, R. Nassar and T. Zhu

Normalized finite element approximate inverse preconditioning for solving non-linear boundary value problems
G.A. Gravvanis and K.M.Giannoutakis

On the optimum value of τ for a variant of the Diffusion Method
G. Karagiorgos, G. Kollias, N. Missirlis and E. Tsigaridas

Tuesday 4:30pm - End

The local modified extrapolated Gauss-Seidel (LMEGS) method
A.A. Consta, N.M. Missirlis and F.I. Tzaferis

A generalised Jacobi preconditioner for finite element solution of large-scale consolidation problems
K.K. Phoon, K.C. Toh, S.H. Chan and F.H. Lee

Adaptive sparse linear solvers for implicit CFD using Newton-Krylov algorithms
L. McInnes, B. Norris, S. Bhowmick and P. Raghavan

Preconditioned iterations for the linearized Navier-Stokes system in rotation form
M.A. Olshanskii

Towards fully mesh adaptive FE-simulations in 3D using multigrid solver
P. Kettil, T. Ekevid and N.-E. Wiberg

34 - Molecular methods in mechanics

Chairpersons: N.G. Hadjiconstantinou, S. Wijesinghe
Rooms: 26-314 (Thursday morning); 26-210 (Thursday afternoon)
**denotes key-note presentations*

Thursday 11:00am – 12:30pm, Room 26-314

***3D continuum-atomistic hybrid simulations**
S. Wijesinghe, R. Hornung, A. Garcia and N. Hadjiconstantinou

Trapping of a colloidal particle in a fluid-filled nanochannel
G. Drazer, J. Koplik, A. Acrivos and B. Khusid

On the hybrid continuum-particle description of liquids
R. Delgado-Buscalioni and P.V. Coveney

Thursday 2:00 – 4:00pm, Room 26-210

***Simulation of nanoindentation via interatomic potential finite element method**
T. Zhu, J. Li, K.J. Van Vliet, S. Yip and S. Suresh

MPI/OpenMP hybrid parallel molecular dynamics simulation of a protein structure on SMP cluster architecture
M. Suzuki, H. Okuda and G. Yagawa

Coarse integration of bubble flows using lattice Boltzmann simulators
C. Theodoropoulos, C.W. Gear, S. Sundaresan and I.G. Kevrekidis

Application of the generalized Boltzmann kinetics in physics of neutral and ionized gases
B.V. Alexeev

Thursday 4:30pm – End, Room 26-210

***Galilean-invariant lattice-Boltzmann models with h-theorem**
B.M. Boghosian

35 - Incompressible flow simulations

Chairpersons: K. Nikfetrat and X. Wang
Rooms: 66-144 (Tuesday) and 26-314 (Wednesday)

Tuesday 11:00am – 12:30pm (Room 66-144)

Parallel computation of unsteady three-dimensional incompressible viscous flow using an unstructured multigrid method
C.H. Tai, Y. Zhao and K.M. Liew

Numerical solution of the incompressible Navier-Stokes equations by a three-level finite element method
V. Gravemeier, W.A. Wall and E. Ramm

Buoyant horizontal jets in a stratified medium
P.L. Morgan and S.W. Armfield

Tuesday 2:00 – 4:00pm (Room 66-144)

Flow induced by superposed oscillations of a circular cylinder
Q. Al-Mdallal and S. Kocabiyik

Numerical simulation of flow in square ducts joined with a mitered 90° elbow
K. Nikfetrat

Numerical simulation of turbulent oscillatory plane Couette flows
C.H. Liu, E.W.M. Ho and C.O. Ng

High order cell function method for Poisson's equations
J. Cai and C. Liu

Tuesday 4:30pm – End (Room 66-144)

A fast and steady algorithm for the unsteady incompressible Navier-Stokes equations
X. Qianxing and Z. Shesheng

Convergence of Chebyshev collocation for the Stokes problem with Neumann boundary conditions
H. Herrero

Mimetic finite difference methods for diffusion equations on unstructured triangular grid
V. Ganzha, R. Liska, M. Shashkov and C. Zenger

Wednesday 11:00am - 12:30pm (Room 26-314)

Analysis and optimization of wind turbines using helicoidal vortex model
J.J. Chattot

Hydrodynamic stability: theoretical concepts, experimental evidence and new challenges
O.S. Ryzhov

37 - Computation of multiphase flows

Chairpersons: A. Alajbegovic and F.J. Moraga
Room: 66-156
**denotes key-note presentation*

Tuesday 11:00am – 12:30pm

***On the modeling of dispersed particulate flows using a multifield model**
P. Tiwari, S.P. Antal, and M. Podowski

Multiphase flow simulations of injector flows
A. Alajbegovic, D. Greif and G. Meister

Coherent flame modeling of turbulent combustion – a validation study
S.N.D.H. Patel, M. Bogensperger, R. Tatschl, S.S. Ibrahim and G.K. Hargrave

Tuesday 2:00 – 4:00pm

CFD investigation of a twin-fluid effervescent atomizer
V. Srinivasan, A. Salazar and K. Saito

Tailoring the pressure drop of structural packing through CFD simulations
C.F. Petre, F. Larachi, I. Iliuta and B. Grandjean

Large eddy simulation of non-isothermal turbulent gas-particle jets
K.N. Volkov

The modeling of bubbly flows around naval surface ships at high Reynolds numbers
F.J. Moraga, A.E. Larreteguy, D.A. Drew and R.T. Lahey, Jr.

Tuesday 4:30pm – End

Direct numerical simulation of multiphase flow systems: a Lagrange multiplies/fictious domain method and its parallel implementation
D. Diaz-Goano, P. Minev and K. Nandakumar

Two-phase tank filling simulations of an automobile tank-system
D. Greif, B. Wiesler and A. Alajbegovic

Analysis of a multi-lattice deterministic trajectory model for dense two-phase flow
C.K. Chan and M. Liu

38 - Inelastic constitutive behavior: micro-macro and phenomenological models

Chairpersons: A. Ibrahimbegovic, S. Klinkel and A. Delaplace
Room: 2-136

Tuesday 11:00am – 12:30pm

Gradient theories of ductile and brittle damage: a thermodynamical consistent framework and computational issues
H. Stumpf, J. Makowski, J. Gorski and K. Hackl

On the theory and numerics of orthotropic elastoplasticity at finite plastic strains
B. Eidel and F. Gruttmann

An anisotropic finite elastic-plastic model for fibre-matrix materials
S. Klinkel, C. Sansour and W. Wagner

Tuesday 2:00 – 4:00pm

Discrete analysis of the dynamic behavior of heterogeneous material
A. Delaplace and A. Ibrahimbegovic

Micro-macro modeling of inelastic behavior of heterogeneous structures
A. Ibrahimbegovic, D. Markovic and D. Brancherie

Damage mechanics model based on structured deformations
M. François, G. Royer-Carfagni

Modeling thermomechanical behaviour of cellular structure made of brittle material
J.B. Colliat, A. Ibrahimbegovic and L. Davenne

Tuesday 4:30pm – End

Anisotropy model for mantle convection
H.-B. Mühlhaus, L. Moresi and M. Čada

R_L models of pseudoelasticity for SMAs at finite strains. Formulation and implementation
M.L. Boubakar, C. Lexcellent, N. Valoroso and B. Vieille

A microplane model for plane-stress masonry structures
G. Borino, G. Cottone and F. Parrinello

40 - Computational fluid geodynamics

Chairpersons: A. Ismail-Zadeh, G. Schubert, and D. Yuen
Room: 2-146
**denotes key-note presentation*

Thursday 2:00 – 4:00pm
Chairperson: A. Ismail-Zadeh

***Four decades of developments in fluid geodynamics: from analytic to numerical models**
G. Schubert

Three-dimensional spherical shell convection at infinite prandtl number using the 'cubed sphere' method
J.W. Hernlund and P.J. Tackley

Stag3D: a code for modeling thermo-chemical multiphase convection in Earth's mantle
P.J. Tackley and S. Xie

Two models in one: mantle flow modeling on different scales beneath the North Atlantic
P. Mihalffy and B. Steinberger

Thursday 4:30pm – End
Chairperson: G. Schubert

Numerical approach to 3D forward modeling of slow viscous flow
I.A. Tsepelev, A.I. Korotkii and A.T. Ismail-Zadeh

Numerical approach to solving problems of slow viscous flow backwards in time
A.T. Ismail-Zadeh, A.I. Korotkii and I.A. Tsepelev

Influences of realistic rheologies and compositional stratification on thermal convection in planets
S.E. Zaranek and E.M. Parmentier

Eulerian spectral/finite difference method for large deformation modelling of visco-elasto-plastic geomaterials
B.J.P. Kaus, Y.Y. Podladchikov and D.W. Schmid

The growth of magnetic field energy in conducting fluids
P. Livermore and A. Jackson

41 - Computational modeling of multiphase and structural composites

Chairpersons: M. Kamiński and S. Ghosh
Room: 26-328

Wednesday 2:00 – 4:00pm

Computational fatigue crack growth analysis in layered composites
L. Figiel and M. Kamiński

Mechanical characterization of epitaxial polysilicon in MEMS
A. Villa, B. De Masi, A. Corigliano, A. Frangi and C. Comi

A new hybrid formulation for laminated composite materials analysis
A.F. Avila and J. Avila Jr.

Theoretical and numerical study of a multi-scale model for composites
S. Meliani, G. Panasenko and L. Paoli

Wednesday 4:30pm – End

Multi-level models for multiple scale damage analysis in composite materials
S. Ghosh and P. Raghavan

Multiresolutional homogenization in transient problems for unidirectional composites
M. Kamiński and M. Ostoja-Starzewski

New three-dimensional finite element formulation for the delamination modeling in composite materials
V. Giannopoulos and A. El-Zafrany

Nonlinear weighted residual approach: application to laminated beams
A.P. Zieliński and F. Frey

42 - Computational models in biology

Chairpersons: R.D. Kamm, D. Tang and A.M. Robertson
Room: 4-370
Chairs for each session are indicated in parentheses.

Tuesday 11:00am – 12:30pm (Kaazempur-Mofrad)

Towards a multi-scale model of cartilage: coarse-graining glycosaminoglycans
M. Bathe, G.C. Rutledge, A.J. Grodzinsky and B. Tidor

New insights in the mechanics of neutrophils
M. Herant and M. Dembo

The numerical design of a parallel plate flow chamber for investigation of endothelial cell response to shear stress
B.J. Chung, A.M. Robertson

Tuesday 2:00 – 4:00pm (Humphrey)

Influence of bifurcation angle on flow into a branch
M. Tadjfar

Computational fluid dynamics analysis of the blood flow in the aortic arch – the effect of aneurysms in various positions on the vessel wall
D. Mori, K. Eguchi, J.K. Cameron, K. Tsubota, S. Wada and T. Yamaguchi

2-D and 3-D multi-physics models for flow and nonlinear stress/strain analysis of stenotic arteries with lipid cores
D. Tang, C. Yang, H. Walker, S. Kobayashi, J. Zheng and D.N. Ku

Requirements for mesh size and mesh type in non linear computational finite element method structural analyses
E.S. Di Martino, S. Yamakawa, K. Shimada and D.A. Vorp

Tuesday 4:30pm – End (Herant)

A nonlinear viscoelastic thin wall model for unsteady flow in stenotic arteries
X. Chen and D. Tang

Effect of viscosity and compression rate on the collapse phase transition of pulmonary surfactant at an air-water interface
S. Rugonyi, E.C. Smith and S.B. Hall

Axisymmetric fluid-structure interaction model of the left ventricle
D. Deserranno, Z.B. Popovic, N.L. Greenberg, M. Kassemi and J.D. Thomas

3D ultrasound-based CFD for carotid flow prediction: a reproducibility study
F.P. Glor, B. Ariff, A.D. Augst, D.C. Barratt, A.D. Hughes, S.A.M. Thom, P.Verdonck and X.Y. Xu

Wednesday 11:00am – 12:30pm (DiMartino)

Computer modeling in aneurysm research
J.D. Humphrey

Finite element modeling from medical images for biomechanical analysis
S.W. Chae and G.W. Kwon

A finite element study on the impact of arterial plaque composition on its biomechanical stability
S. Patel, M. Kaazempur-Mofrad, A. Isasi, G. Sukhova and R. Kamm

Wednesday 2:00 – 4::00pm (Kaazempur-Mofrad)

Biomagnetic (blood) fluid flow in a 3D duct
E.E. Tzirtzilakis, V.D. Sakalis, N.G. Kafoussias and P.M. Hatzikonstantinou

Computational analysis of tumor angiogenesis using a two-dimensional model
E.B. Shim and T.S. Deisboeck

Simulation study on change in mechanical property of cancellous bone due to trabecular microstructural changes
K. Tsubota and T. Adachi

Process of hip joint prosthesis design including bone remodeling phenomenon
M. Pawlikowski, K. Skalski and M. Haraburda

Wednesday 4:30pm – End (Tang, Shim)

Some advances in modeling multiphysics-biomedical applications
N. Elabbasi, K.J. Bathe

Investigation of the biomechanical environment within the optic nerve head by finite element modeling
I.A. Sigal, J.G. Flanagan, I. Tertinegg and C.R. Ethier

Designing hearing-aid components with FEA
D. Tourtelotte, S. Sundermurthy and T. Burns

Characterizing feedback in hearing-aids through FEA
T. Burns, S. Sundermurthy and D. Tourtelotte

Design of a single capillary-parenchymal co-culture bioreactor using a self-assembling peptide membrane
E.S. Kim, M.R. Kaazempur-Mofrad, J.T. Borenstein, J.P. Vacanti and R.D. Kamm

43 - Determination of stress intensity factors

Chairpersons : B. Karihaloo and L. Banks-Sills
Room: 2-132
**denotes keynote paper*

Friday 11:00am – 12:30pm

***Calculation of stress intensity factors for bimaterial notches – thermal stresses**
L. Banks-Sills and C. Ishbir

Stress intensity factors and T-stress in functionally graded materials: a unified approach using the interaction integral method
J.-H. Kim and G.H. Paulino

High order stabilization for Navier-Stokes CFD algorithms
A.J. Baker and A. Kolesnikov

Friday 2:00 – 4:00pm
Chairperson: L. Banks-Sills

Modelling of a 3-D shallow surface crack in a nuclear pressure pipe by a three-term asymptotic solution: J-A2 methodology
F. Labbe and J.R. Donoso

The potential functions method in boundary value problems of the elasticity theory for bodies with defects
A.A. Gousenkova

44 - Accurate simulation of crack problems

Chairpersons: B. Karihaloo and J. Schröder
Room: 2-132
**denotes key-note speaker*

Thursday 11:00am – 12:30pm

***Direct determination of SIF and coefficients of higher order terms of mixed mode cracks**
B. Karihaloo, Q.Z. Xiao and X.Y. Liu

Higher order terms for a crack terminating at the interface between mismatched solids
A. Banerjee and J.W. Hancock

Boundary element computation of crack root stress fields in three dimensions
J.O. Watson

Thursday 2:00 – 4:00pm

Numerical prediction of the propagation of branched fatigue cracks
M.A. Meggiolaro, A.C.O. Miranda, J.T.P. Castro and L.F. Martha

Finite element modeling of fatigue crack bifurcation
A.C.O. Miranda, M.A. Meggiolaro, J.T.P. Castro and L.F. Martha

Analysis of partially closed oblique edge crack under surface travelling load
M. Beghini, L. Bertini and V. Fontanari

Behaviour of small fatigue cracks emanating from notches in Ti-6A1-4v
M. Benedetti, L. Bertini and V. Fontanari

Thursday 4:30pm – End

Elastoplastic behavior of two-dimensional solids with mixed-mode cracks
V. Grychanyuk and I. Tsukrov

Numerical aspects of a triangular finite element with an embedded discontinuity
J. Löblein and J. Schröder

Numerical validation of various linear spring stiffness definitions for simple physical model for transverse displacements analysis of cracked beam elements
M. Skrinar

45 - Computational procedures for biological tissue

Chairpersons: M. Kojic, S. De and J. Kim
Room: 4-370

Thursday 11:00am – 12:30pm

Can morphogen activity be enhanced by its inhibitors?
J.C. Kao, Q. Nie, A. Teng, F. Y.M. Wan, A.D. Lander and J.L. Marsh

Modeling of blood flow in the human aorta with use of an orthotropic nonlinear material model for the walls
M. Kojic, N. Filipovic, I. Vlastelica and M. Zivkovic

Dynamics of airway closure: critical smooth muscle activation
S.M. Mijailovich

Thursday 2:00 – 4:00pm

A hybrid modeling scheme for soft tissue simulation in virtual reality based medical trainers
J. Kim, S. De and M.A. Srinivasan

Requirements for mesh size and mesh type in non linear computational finite element method structural analyses
E.S. Di Martino, S. Yamakawa, K. Shimada and D.A. Vorp

46 - Computational models using Trefftz functions

Chairpersons: V. Kompis and B. Pluymers
Room: 26-314
**denotes key-note presentation*

Wednesday 2:00- 4:00pm

Survey and applications of special purpose T-complete systems
A. Wroblewski and A.P. Zieliński

Thin-walled spatial structures optimized using Trefftz-type finite elements
B. Szybiński, M. Karaś and A.P. Zieliński

Solution representation for Trefftz-type plate bending elements
R. Piltner

Use of Trefftz functions in modelling of point and line contact
M. Toma and V. Kompis

Wednesday 4:30pm – End

***A new and more general version of hybrid-Trefftz finite-element (ht-fe) model**
I. Herrera

Rigid inclusions solved using non-singular reciprocity based BEM
M. Štiavnicky and V. Kompis

Computational models using Trefftz functions
V. Kompis

Experimental validation of the wave based prediction technique for the analysis of the coupled vibro-acoustic behaviour of a 3D cavity
B. Pluymers, A. Hepberger, W. Desmet, H.H. Priebsch, D. Vandepitte and P. Sas

47 - Computational concepts for shell structures

Chairpersons: W.B. Krätzig, A. Ibrahimbegovic, J. Sorić and W. Wagner
Room: 2-105

Tuesday 11:00am – 12:30pm

On a new reduced integration technology for thing structures in finite inelasticity
S. Reese

On the buckling mechanisms of large-scale shell structures made of high-strength concrete
M. Andres and R. Harte

A rational framework for damage analyses of concrete shells
D. Jun, Y. Petryna, J. Bockhold and F. Stangenberg

Tuesday 2:00 – 4:00pm

On classical shell theories, degenerated and solid shell concepts and layered models – an overview over inherent errors
W.B. Krätzig

A "global" finite element model for the simulation of failure of spot welded assemblies during impact
A. Combescure, F. Delcroix, L. Caplain and S. Espanol

Face layer wrinkling in sandwich shells of general configuration
W.K. Vonach and F.G. Rammerstorfer

On dynamics and large strain analysis of shells
B. Brank, A. Ibrahimbegovic and J. Korelc

Tuesday 4:30pm – End

On damage modelling of laminated composite shells subjected to low velocity impact
I. Smojver and J. Sorić

Simulation of buckling tests using a mixed FEM for pressurized shallow spherical shells and the reduced stiffness analysis
S. Yamada and M. Uchiyama

A distortion-insensitive four noded membrane quadrilateral that passes the patch test
C.A. Felippa

The variational theory of complex rays for medium-frequency vibrations of shells
H. Riou, P. Ladevéze and P. Rouch

Wednesday 11:00am – 12:30pm

Special aspects of surface-related shell theories with application to contact problems
B. Zastrau, R. Schlebusch and J. Matheas

Dynamical analysis of a thin flexible rod with both bending and torsional effects
R. Yasumitsu, M.C. Natori and K. Nishinari

Numerical integration of singular Kelvin-functions applied to plates on an elastic foundation
P. Jahn and F. Hartmann

Wednesday 2:00 – 4:00 pm

Buckling mode extracted from iterative solution procedures for stiffness equations
H. Noguchi, S. Yataka and F. Fujii

An EAS-based shell element for non linear material behaviour in case of a state of plane stress
T. Wenzel

Finite element analysis of a surface modeled after a folded leaf
K.K. Choong, K.W. Ng, C. Yamamoto and M.M. Ratnam

Numerical-analytical analysis of thermo-stressed state of viscoelastic cylindrical shell
A.F. Abdukadirovna

Wednesday 4:30pm – End

General shell elements adapted to coupling
D. Chapelle, A. Rezgui and M. Vidrascu

Special features of deformation of cylindrical panels under pulsating load
A. Karshiev

On optimal stabilized MITC4 plate bending elements for accurate frequency response analysis
L. Thompson

48 - Analytical and numerical studies of vortical flows

Chairpersons: E. Krause and D. Blackmore
Room: 66-156
**denotes key-note presentation*

Wednesday 11:00am - 12:30pm
Chairperson: D. Blackmore

***Vortex phenomena in flows for reusable launch vehicles**
C. Weiland

Vortex formation and shedding from an airfoil at high angle of attack – a numerical study
M. Breuer and N. Jovicic

Axial flow in slender vortices
E. Krause

Wednesday 2:00 – 4:00pm
Chairperson: E. Krause

Cycle-resolved computations of compressible vortical flows in automotive engines
N. Naitoh, K. Kuwahara and E. Krause

Vorticity jumps across shock surfaces
D. Blackmore and L. Ting

Theory of slender compressible vortex filaments
O. Knio, L. Ting and R. Klein

Wednesday 4:30pm – End
Chairperson: D. Blackmore

***From LES via APE to trailing-edge noise**
W. Schröder and R. Ewert

Oblique shock vortex interaction over a wedge
O. Thomer, M. Klaas, W. Schroeder and E. Krause

Vortex breakdown in a cylinder with a free surface
E. Serre, M. Schaëfer and P. Bontoux

Vortical flow simulation using combined compact difference scheme with high resolution
K. Ishii, T. Nihei and S. Adachi

49 - Microfluidics and BioMEMS simulation

Chairpersons: N. Phan-Thien and S. Hardt
Room: 26-210
**denotes key-note presentation*

Friday 11:00am – 12:30pm

Microfluidics and wetting: evidence of several time scales
D. Seveno, G. Martic, F. Gentner, M. Voué and J. De Coninck

Modeling hydrodynamic focusing of liquid jets in microchannels
S. Hardt

Silicon microstructure for preconcentration of metallic ions
J.A.F. da Silva and R. Furlan

Friday 2:00 – 4:00pm

***DNA molecular suspension flow in microchannels**
X. Fan, N. Phan-Thien (Presenter), T.Y. Ng, S. Chen and X. Wu

FCM-spectral element method for simulating colloidal micro-devices
D. Liu, M. Maxey and G.E. Karniadakis

A dilute mixing model in microchannels
Z. Wu, N.-T. Nguyen

Numerical model of flow in distensible microfluidic network
E.J. Weinberg, M.R. Kaazempur-Mofrad and J.T. Borestein

50 - The modeling and control of chaos in systems of industrial importance

Chairpersons: X. Li, J. Glimm and C.W. Shu
Room: 2-132
**denotes key-note presentation*

Tuesday 11:00am – 12:30pm

***Jet breakup and spray formation in a diesel engine**
J. Glimm, X. Li, M.-N. Kim, W. Oh, A. Marchese, R. Samulyak and C. Tzanos

Simulation of fluid mixing in acceleration driven instabilities
E. George, J. Glimm, X.L. Li and Z. Xu

The effect of electrostatic forces on droplet suspensions
G. Tryggvason, A. Fernández and J. Lu

Tuesday 2:00 – 4:00pm

***Resolution of high order WENO schemes and Navier-Stokes simulation of the Rayleigh-Taylor instability problem**
Y.-T. Zhang, J. Shi, C.W. Shu and Y. Zhou

Chemical amplifiers
H.M. Hastings, S.G. Sobel, S. Chaterpaul, C. Frank, E. Russell and J. Pekor

An interactive simulation platform and its industrial applications
Z. Chen

Computers and arrhythmias: computational approaches to understanding cardiac electrical dynamics
F.H. Fenton, E.M. Cherry, H.M. Hastings and S.J. Evans

Tuesday 4:30pm – End

Fluid mixing in multiphase porous media flows
F. Furtado and F. Pereira

Numerical investigation of the rotor-IGV interaction in a 1.5-stage transonic compressor using gaseous R134a as medium
S. Kristukat, C. Mahowald and A. Bölcs

51 - Fluid flows in design

Chairpersons: R. Löhner and B. Schott
Room: 66-144

Thursday 11:00am – 12:30pm
Chairpersons: R. Löhner and B. Schott

Multi-scale fluid flow simulations for the semiconductor industry
B. Schott, J. Kaczynski and A. Baldy

An analysis of wind environment around buildings with unstructured mesh generation technique
K. Nojima and M. Kawahara

Thursday 2:00 – 4:00pm
Special Sub-session: *Optimal Shape Design*
Chairpersons: R. Löhner, P. Neittaanmäki, O. Pironneau

High fidelity models in the multi-disciplinary optimization of a frigate ship
D. Peri and E.F. Campana

Multifrequency shape optimization of an acoustic horn
M. Berggren, E. Bängtsson and D. Noreland

Shape optimization and shocks
B. Mohammadi and O. Pironneau

Discrete adjoint-based shape optimization for an edge-based finite-volume solver
O. Amoignon and M. Berggen

Thursday 4:30pm – End
Chairpersons: R. Löhner and B. Schott

Transient evolution to periodic fluid flow and heat transfer in a lid-driven cavity due to an oscillating thin fin
X. Shi and J.M. Khodadadi

Near-wall coherent structures in the turbulent channel flow of a dilute polymer solution
S. Sibilla and C.P. Beretta

Numerical simulation of a single-emitter colloidal jet
J.A. Carretero and M. Martinez-Sanchez

Optimization of multi-element aerodynamic configurations for maximum lift
M. Nemec and D.W. Zingg

Friday 11:00am – 12:30pm
Chairpersons: R. Löhner and B. Schott

An adjoint method for shape optimization of rotating blades
L. Martinelli and J.J. Dreyer

An adjoint-based shape optimization scheme for CFD problems
R. Löhner, O. Soto and C. Yang

Comparison of two optimizers applied to ship resistance minimization
N. Hirata

Friday 2:00 – 4:00pm
Chairpersons: R. Löhner and B. Schott

Aerodynamic shape and planform optimization of wings using a viscous reduced adjoint gradient formula
S. Kim, K. Leoviriyakit and A. Jameson

Generalized method for solving boundary value problems with experimentally determined boundary conditions: wall-interference of transonic wind tunnels
B. Rasuo

A numerical study of the boundary layer development on a flat plate under the influence of the passing wake from a cylinder
D.K. Das and Z. Sultana

Annular spread of a thin liquid film over a rotating disk
B. Scheichl and A. Kluwick

52 - Fluid-structure interactions

Chairpersons: H. Matthies and R. Ohayon
Room: 66-168

Wednesday 11:00am – 12:30pm

Fluid-structure coupling within a monolithic model involving free surface flows
E. Walhorn, B. Hübner, A. Kölke and D. Dinkler

Fluid-structure interaction in civil engineering
E. Rank, D. Scholz, A. Halfmann, M. Glück, M. Breuer and F. Durst

Representation of liquid sloshing in elastic 3D tanks by equivalent mechanical systems and symmetric reduced models
J.-S. Schotté and R. Ohayon

Wednesday 2:00 – 4:00 pm

Coupled finite element – wave based approach in steady-state structural-acoustics
B. van Hal, W. Desmet, D. Vandepitte and P. Sas

Efficient partitioned solution methods for the computation of fluid-structure interactions
H. Bijl and A.H. van Zuijlen

A quasi-Newton method for a fluid-structure problem arising in blood flows
J.-F. Gerbeau

Wednesday 4:30pm – End

Space-time adaptive solution of fluid-structure interaction problems
O. Kayser-Herold and H.G. Matthies

Modal analysis of fluid-structure systems: reduced models accuracy and experimental validation
M. Menelle and R. Ohayon

Fluid-structure interaction analysis with a subsonic potential-based fluid formulation
T. Sussman and J. Sundqvist

On the validation and application of fluid-structure-interaction analysis of reactive vessel internals at loss of coolant accidents
L. Andersson, P. Andersson, J. Lundwall, J. Sundqvist, K. Nilsson, and P. Veber

Thursday 11:00am – 12:30pm

Simulation of a fast decompression of the HDR test facility with a new incompatible fluid-structure interface algorithm
F. Casadei and S. Potapov

The design of acoustic resonant chambers by numerical simulation
S. Cancelos, F.J. Moraga, I.S. Akhatov, R.T. Lahey, Jr. and R.H. Parsons

Structural-acoustic sensitivity analysis for optimization of shell geometry with respect to lower noise emission
D. Fritze, S. Marburg, H.-J. Hardtke

Thursday 2:00 – 4:00pm

Fully coupled analysis and sensitivity analysis for electrostatic-fluid-structure interaction problems
M. Raulli and K. Maute

A non-linear finite element model for the analysis of liquid-filled tanks under earthquake excitation
M. Brüggemann, R. Harte and W. Zahlten

Fluid structural interactions in the inner ear
M. Kassemi, D. Deserranno and J.G. Oas

Structural dynamics analysis on launch simulations and fluid-structure-interaction
R. Kroyer

Thursday 4:30pm – End

Stochastic flow-structure interactions
D. Lucor and G.E. Karniadakis

An exact Block-Newton algorithm for the solution of implicit time discretized coupled systems involved in fluid-structure interaction problems
M.A. Fernández and M. Moubachir

Parallel multi-steps strong coupling method for interaction of incompressible viscous fluid and an elastic body
D. Ishihara, S. Yoshimura and G. Yagawa

Free surface approach embedded in a fluid structure interaction framework
W.A. Wall, S. Genkinger and E. Ramm

54 - Computational multiscale modeling of advanced composites

Chairpersons: S.A. Meguid and M.S. Attia
Room: 2-143

Thursday 2:00 – 4:00pm

Prediction of damage in a randomly oriented short-fiber composite plate containing central hole
B.N. Nguyen and M.A. Khaleel

Multiscale modelling of crush behaviour of closed-cell aluminium foam
M.S. Attia, S.A. Meguid and K.M. Liew

Dynamic multiscale simulation of towed cable and body
Z.H. Zhu, S.A. Meguid and L.S. Ong

Multiscale modeling of variable stiffness ankle-foot orthosis
S. Redekop, S.A. Meguid, G. Sagals, J.C. Stranart and K. Parker

57 - Computational combustion

Chairpersons: H. Najm, C. Romine and A. Ghoniem
Room: 66-154

Wednesday 2:00 – 4:00pm

Reduced models for adaptive chemistry simulation of reacting flows
P. Lu, B. Bhattacharjee, P.I. Barton and W.H. Green

Towards dynamically reduced mechanisms based on domain splitting
T. Løvås, E. Blurock and F. Mauss

A component-based scientific toolkit for reacting flows
S. Lefantzi and J. Ray

Analysis of parametric uncertainty propagation in detailed combustion chemistry
M.T. Reagan, H.N. Najm, R.G. Ghanem and O.M. Knio

Wednesday 4:30pm – End

Local and global manifolds in stiff reaction-diffusion systems
M. Valorani, F. Creta and D.A. Goussis

Inertial manifolds with CSP
D.A. Goussis, M. Valorani, F. Creta and H.N. Najm

Numerical simulation of strength of turbulence effect on normal shock/homogeneous turbulence interaction
M.A. Jinnah and K. Takayama

Fuel-stratification in automotive engines with vortical flow structures – an engineering approach with numerical and experimental methods
A. Abdelfattah, B. Durst, W. Huebner and W. Kern

58 - Innovative methods in optimal design and control

Chairpersons: P. Neittaanmäki and E.N. Dvorkin
Room: 26-204

Tuesday 11:00am – 12:30pm

Optimization of composite panels using neural networks and genetic algorithms
W. Ruijter, R. Spallino, L. Warnet and A. de Boer

Reconstruction of velocity data, using optimization
J. Lundvall, P. Weinerfelt and M. Karlsson

A mono-level iterative approach to optimum design under system reliability constraint
L. Xu, G. Cheng

Tuesday 2:00 – 4:00pm

Evaluation and comparison of geometry representation methods for structural topology optimization
S.Y. Wang and K. Tai

Optimal modal control of beams under moving mass
M.R. Shadnam and F.R. Rofooei

Shape optimization of a body located in incompressible viscous flow
H. Yagi and M. Kawahara

An application of automatic differentiation to optimal control of fluid force around a circular cylinder
M. Inou and M. Kawahara

Tuesday 4:30pm – End

Application of multicriteria optimization to some optimal control and design problems
P. Neittaanmäki, K. Miettinen and M.M. Mäkelä

Robust control of continuum systems: a spectral approach
N. Zabaras and V.A.B. Narayanan

59 - Inverse problems from thermal/fluids and solid mechanics applications

Chairpersons: L. Olson and N. Zabaras
Room: 2-143

Wednesday 2:00 – 4:00pm
Chairperson: N. Zabaras

3D stress field tomography based on photoelasticity
M.L.L. Wijerathne, K. Oguni and M. Hori

Recent progress on computational inverse techniques in non-destructive evaluation
G.R. Liu and X. Han

Solution of implicitly formulated inverse heat transfer problems with hybrid methods
A.J. S. Neto and F.J.C.P. Soeiro

Estimating endocardial potentials form a noncontact probe
L.G. Olson, R.D.Throne and J.R. Windle

Wednesday 4:30pm – End
Chairperson: L. Olson

Material constant sensitivity boundary integral equations for anisotropic solids
R. Gallego, L. Comino, A. Ruiz-Cabello

A spectral stochastic approach to the inverse heat conduction problem
V.A.B. Narayanan and N. Zabaras

Predictability of surface temperatures from FEA calibrated thermal constants
C.W. Hu, J.K.C Shih, R. Delpak, A. Wawrzynek, M. Bartoszek

Parameter identification of Young's modulus considering excavation for 3-D tunnel
A. Hikawa, M. Kawahara and N. Kaneko

61 - Structural optimization

Chairpersons : M. Papadrakakis and K.-U. Bletzinger
Room: 35-225

Wednesday 2:00 – 4:00pm

Multi-objective evolutionary algorithms for structural optimization
C.A.C. Coello, G.T. Pulido and A.H. Aguirre

Searching for an efficient method in multiobjective frame optimisation using evolutionary algorithms
D. Greiner, G. Winter and J.M. Emperador

On the significance of locking on shape optimization of shells
N. Camprubí, M. Bischoff, K.-U. Bletzinger

Structural optimization of stiffened shells using evolutionary algorithms
M.M. Fragiadakis, N.D. Lagaros and M. Papadrakakis

Wednesday 4:30pm – End

A new visualization method of multidimensional numerical models for structural optimization
M. Papadrakakis, N.D. Lagaros and V. Sevastyanov

Finite element analysis of shells with multiple random material and geometric properties
G. Stefanou and M. Papadrakakis

The preference vector method for multicriteria design optimization using evolutionary algorithms
A. Osyczka and S. Krenich

Thursday 11:00am – 12:30pm

Discrete optimization approach to design of reinforced concrete frames
M. Lepš

Object-oriented computational environment for analysis of thermo-viscoelastic bodies including sensitivity, optimization and damage analysis
P. Tauzowski and M. Kleiber

A study of body attachment stiffness analysis for noise improvement of a vehicle
K.-C. Kim, I.H. Choi and K.-H. Park

63 - Arbitrary Lagrangian-Eulerian methods in computational fluid dynamics and computational solid dynamics

Chairpersons: Rick Pember and R.W. Anderson
Room: 66-156
**denotes key-note presentation*

Friday 11:00am – 12:30pm

***Coupled Eulerian-Lagrangian simulations using a level set method**
S. Mauch, D. Meiron, R. Radovitzky and R. Samtaney

Capturing contact discontinuous using the unified coordinates
W.H. Hui and G.P. Zhao

A posteriori truncation error detection with application to grid adaptation
G. Lapenta

Friday 2:00 – 4:00pm

A dynamically adaptive arbitrary Lagrangian-Eulerian method for hydrodynamics
R.W. Anderson, R. Pember and N.S. Elliott

The compatible formulation of Lagrangian hydrodynamics
E.J. Caramana

Second-order, local-bound-preserving, remapping for ALE methods
M. Kucharik, M. Shashkov and B. Wendroff

Modelling of dynamic friction experiments using a multi-material Arbitrary Lagrangian Eulerian code
A.J. Barlow

65 - Research scientific software for partial differential equations

Chairpersons: O. Pironneau and P. Frey
Room: 2-136

Friday 11:00am – 12:30pm

FreeFem++, a finite element PDE solver
F. Hecht

MEDIT: a platform visualization tool
P. Frey

OpenFEM: an opensource finite element toolbox
D. Chapelle

Friday 2:00 – 4:00pm

ELMER – a finite element program for multiphysics
M. Lyly

66 - Multiscale material modeling and simulation

Chairpersons: R. Radovitzky and A. Cuitino
Room: 35-225

Thursday 2:00 – 4:00pm

Membranes and rods from lattice films and chains: modelling and computations
M. Arroyo and T. Belytschko

Large scale limit of Monte-Carlo simulations of grain growth
P. Yu and S. Ta'asan

A study of nano-indentation using coupled atomistic and discrete dislocation (CADD) modeling
R.E. Miller, L. Shilkrot and W.A. Curtin

Evaluation of continuum stress in atomistic simulation
J.A. Zimmerman, E.B. Webb III, J.J. Hoyt, R.E. Jones, P.A. Klein and D.J. Bammann

Thursday 4:30pm – End

Multiscale meshfree method for the analysis of carbon nanotube based materials
D. Qian

A kinematics perspective on the micro-to-macro transition in anisotropic plasticity modeling of polycrystalline solids
W. Tong, N. Zhang and C. Xie

Multiscale simulation of grain growth in nanocrystalline materials
D. Moldovan, A.J. Haslam and D. Wolf

Multiscale modeling of particle-modified semicrystalline polymers
J.A.W. van Dommelen, W.A.M. Brekelmans and F.P.T. Baaijens

A method for developing a continuum model for in-plane fabric behavior
M.J. King and S. Socrate

Friday 11:00am – 12:30pm

Multi-scale finite element analysis of piezoelectric materials based on crystallographic homogenization method
Y. Uetsuji, Y. Nakamura, S. Ueda and E. Nakamachi

A numerical method for the treatment of image stresses in dislocation dynamics simulations
L. Yan, T.A. Khraishi, Y.-L. Shen and M.F. Horstemeyer

Modeling deformation and fracture processes at the atomistic and nano scales
D. Farkas

Friday 2:00 – 4:00pm

A proper orthogonal decomposition approach to microstructure model reduction in Rodrigues space with applications to the control of material properties
S. Acharjee, S. Ganapathysubramanian and N. Zabaras

A finite-element technology for modeling single and multiwall carbon nanotubes
A. Pantano, D.M. Parks and M.C. Boyce

Simulation of subgrain deformation structures in polycrystals
R. Radovitzky, A. Cuitiño

67 - Computational damage mechanics in metal forming

Chairpersons: K. Saanouni and T. Pardoen
Room: 26-310
**denotes key-note presentations*

Wednesday 2:00 – 4:00pm

***Finite anisotropic plastic flow with ductile damage for sheet metal forming simulation**
K. Saanouni, N. Belamri, M. Khelifa, H. Badreddine and A. Cherouat

A gradient-enhanced plasticity-damage approach towards modelling of forming processes
R.H.J. Peerlings, R.A.B. Engelen, J. Mediavilla and M.G.D. Geers

Modelling and simulation of thin sheet blanking
Ch. Poizat, L. Campagne, L. Daridon, Ch. Husson, L. Merle and S. Ahzi

Enhancing formability of aluminium alloys by superimposing hydrostatic pressure
L. Filice, L. Fratini and F. Micari

Wednesday 4:30pm – End

***Current challenges in the transfer to metal forming of top-down approaches to ductile fracture**
T. Pardoen

Spring-back simulation based on characterization of sheet metals under reverse plastic strains
A.A. Krasowsky, H. Riedel, W. Schmitt and O.I. Benevolenski

Micromechanical nonlocal damage modeling
J. Chambert, N. Pernin, V. Lemiale and P. Picart

68 - Bridge structures

Chairpersons: E.J. Sapountzakis and G Stefanou
Room: 2-142
**denotes key-note presentation*

Thursday 2:00 – 4:00pm

Effect of inelastic behavior of cables on ultimate behavior and strength of a 600-meter steel cable-stayed bridge
M. Nagai, E. Iwasaki and K. Nogami

Extending the service life of steel bridges through field instrumentation
R.J. Connor and J.W. Fisher

Prediction of lateral distribution of vehicular live loads on bridge girders by the refined analysis method
Y.F. Chen

Thursday 4:30pm – End

***Warping shear stresses in nonuniform torsion in bridge decks of materials in contact by BEM**
E.J. Sapountzakis and V.G. Mokos

MEMS-type accelerometers and wireless communication for structural monitoring
H.C. Chung, T. Enomoto and M. Shinozuka

Simulation of buckling of bridge laced members with moment-curvature elements
A. Krimotat, H. Sedarat, A. Kozak and A.M. Itani

Nonlinear FE analyses of RC bridge frame corners based on fracture mechanics
H. Hamidifar

70 - Computational stochastic mechanics

Chairpersons: G.I. Schuëller / G. Deodatis
Rooms: 26-310 (Thursday), 26-328 (Friday)

Thursday 11:00am – 12:30pm (Room 26-310)

Upper bounds on the response variance of stochastic systems via generalized variability response functions
G. Deodatis, L. Graham-Brady and R. Micaletti

Probabilistic failure analysis by simulation
S.K. Au

A reanalysis technique for structures under with noise excitation
P. Cacciola, N. Impollonia and G. Muscolino

Thursday 2:00 – 4:00pm (Room 26-310)
Chairpersons: H.G. Matthies / C.A. Schenk

Hierarchical parallel solution of stochastic systems
A. Keese and H.G. Matthies

Probabilistic descriptions of wind effects for database-assisted design
S.M.C. Diniz and E. Simiu

Bounded-but-unknown uncertainty optimization of micro-electro-mechanical-systems
S.P. Gurav, M. Langelaar, J.F.L. Goosen and F. van Keulen

Interval estimation of time-history response without use of direct time integration
S. Nakagiri, Y. Hoshi and T. Yamada

Thursday 4:30pm – End (Room 26-310)
Chairpersons: H.A. Jensen / C.A. Schenk

Computational strategy for the analysis of assemblies containing interface uncertainties
C. Blanzé and L. Champaney

Generation and analysis of design acceleration time histories compatible with Finnish YVL 2.6 regulatory guide design spectrum
P. Varpasuo

Fatigue and fracture reliability analysis under random loading
A.T. Beck and R.E. Melchers

Friday 11:00am – 12:30pm (Room 26-328)
Chairpersons: M. Shinozuka / S.-H. Kim

Fragility analysis for transportation network systems under earthquake damage
M. Shinozuka, Y. Murachi and X. Dong

Development of retrofitted bridge fragility curves using PDF interpolation technique
S. Kushiyama, S.-H. Kim, J.-H. Yi and M. Shinozuka

The seismic fragility analysis of electric power equipment
M. Shinozuka and X. Dong

71 - Uncertainties in structural mechanics/analysis

Chairpersons: G.I. Schuëller / R. Ghanem
Room: 2-143

Tuesday 11:00am – 12:30pm

A general purpose library for stochastic finite element computations
R. Ghanem and J. Abras

The role of uncertainties in performance-based design of dynamical systems
H.A. Jensen

Fuzzy stochastic finite element method
B. Möller, W. Graf, M. Beer and J.-U. Sickert

Tuesday 2:00 – 4:00pm
Chairpersons: B. Möller / S.K. Au

A moment-based stochastic method for response moment and reliability analysis
H. Xu and S. Rahman

Propagation of non-Gaussian stochastic behavior using the polynomial chaos expansion
S.-K. Choi, R.V. Grandhi and R.A. Canfield

Uncertainty quantification using evidence theory with a cost-effective algorithm
H.-R. Bae, R.V. Grandhi and R.A. Canfield

Structural damage assessment with uncertainties
Y.S. Petryna and W.B. Krätzig

Tuesday 4:30pm – End
Chairpersons: S. Wojtkiewicz / A. Olsson

Distribution-free uncertainty quantification
S. Wojtkiewicz

Latin hypercube sampling for structural reliability and importance sampling
G. Sandberg and A. Olsson

Efficient random fields simulation for stochastic FEM analyses
M. Vořechovský and D. Novák

Wednesday 11:00am – 12:30pm
Chairpersons: S. Wojtkiewicz / Y. Petryna

Uncertainty-based loads analysis for spacecraft: finite element model validation and dynamic responses
A. Calvi and M. Klein

Nonstationary response of large, linear FE-systems under stochastic loading
G.I. Schuëller, H.J. Pradlwarter and C.A. Schenk

Nonstationary response of large, hysteretic FE-systems
C.A. Schenk, G.I. Schuëller and H.J. Pradlwarter

72 - Computational geomechanics

Chairpersons: H.F. Schweiger, A. Whittle, T. Benz, G. Oettl, H. Taiebat, S.Messerklinger, S.J. Antony and C. Wiltafsky
Room: 35-225
**denotes key-note presentations*

Tuesday 11:00am – 12:30pm
Chair: A. Whittle, Co-chair: T. Benz

Numerical simulations in geotechnics based on a multiphase FE approach
G. Oettl, R.F. Stark and G. Hofstetter

Continuum-micromechanics approach for determination of frost heave in artificial ground freezing
Ch. Pichler, R. Lackner and H.A. Mang

Effect of grain shape on the shear deformation characteristics of granular media
R. Momoh, S.J. Antony and M.R. Kuhn

Tuesday 2:00 – 4:00pm
Chair: H.F. Schweiger, Co-chair: G. Oettl

***Recent advances in the upper bound limit analysis of Tresca's material**
A.M. Puzrin and M.F. Randolph

Contact between soil and circular foundations under eccentric loading
H.A. Taiebat and J.P. Carter

Modelling the anisotropy of soft Swiss lacustrine clay
S. Messerklinger and S.M. Springman

An advanced constitutive model for normally consolidated clays based on multilaminate framework
C. Wiltafsky, M. Koskinen and H.F. Schweiger

Tuesday 4:30pm – End
Chair: H. Taiebat, Co-chair: S.Messerklinger

***Quasi-static undrained expansion of a cylindrical cavity in clay in the presence of shaft friction and anisotropic initial stresses**
S. Sagaseta, G.T. Houlsby and H.J. Burd

Bounding surface plasticity for cyclic loaded sand and its implementation
T. Benz

A computational strategy for solving three-dimensional tunnel excavation problems
Y.-M. Hsieh and A.J. Whittle

A fast 3D tunnel analysis
S.C. Möller, P.A. Vermeer and P.G. Bonnier

The calculation of a normal force between multiparticle contacts using fractional operators
J.S. Leszczynski

Wednesday 11:00am – 12:30pm
Chair: S.J. Antony, Co-chair: C. Wiltafsky

Discrete element simulations using macro-particles
D. Pelessone

Finite element modelling of soil-structure-systems in workstation clusters
L. Laemmer, U.F. Meissner and J. Ruben

Numerical modelling for non-linear wave-pipe-seabed interaction
D.S. Jeng

73 - Nonlinear time-history of long span seismic bridge design and retrofit

Chairpersons: A. Krimotat and T.J. Ingham
Room: 2-142

Friday 11:00am – 12:30pm

Nonlinear time history analysis for the seismic retrofit of the Richmond San Rafael Bridge
R.A. Dameron, D.R. Parker and T. Dahlgren

Seismic response analysis of long-span bridges using nonlinear dynamic analysis techniques
R.A. Imbsen and M. Sarraf

Nonlinear time history analysis of the Million Dollar Bridge
T.J. Ingham

Friday 2:00pm – End

Numerical and experimental investigation of reinforced concrete key structural components of the new San Francisco-Oakland Bay Bridge
A. Dazio, E.M. Hines, D. Parker and F. Seible

Numerical and experimental investigation of steel structural component of the new San Francisco-Oakland Bay Bridge
C.C. Chou, C.C. McDaniel, C.M. Uang and F. Seible

Seismic retrofit strategy, design, and construction of the San Francisco-Oakland Bay Bridge west crossing
R.B. Heninger, R.C. Larsen and R.R. Simmons

Nonlinear time-history analysis and seismic retrofit design of 6th Street Viaduct in LA
R.K. Dowell

Seismic evaluation of a new Cooper River Bridge in Charleston, SC
H. Sedarat, A. Kozak, A. Krimotat, M.J. Abrahams, J. Wang and L. Mesa

Soil-structure interaction approaches for long-span bridges against earthquake loading new design and retrofitting
I.P. Lam, A. Krimotat, H. Law and H. Sedarat

A dynamic analysis of cable vibration control on cable-stayed bridges
R.W. Wolfe, H.J. Farran and R.B. Heninger

74 - High accuracy compact schemes and their applications to CFD

Chairpersons: M. Carpenter, K.Ghia, T.K. Sengupta and P. Sagaut
Rooms: 66-144
**denotes key-note presentation*

Wednesday 11:00am – 12:30 pm

***High-order block-structured finite-difference schemes for complex geometries**
M. Carpenter

High accuracy compact schemes and Gibbs' phenomenon
G. Ganeriwal and T.K. Sengupta

High order difference method on staggered, curvilinear grids for the incompressible Navier-Stokes equations
J. Nilsson, B. Gustafsson, P. Lötstedt and A. Brüger

Wednesday 2:00 – 4:00 pm

Navier-Stokes solution by new compact schemes for incompressible flow
T.K. Sengupta, G.Anuradha and S. De

Analysis of higher-order compact differencing scheme by studying flow past a circular cylinder
H. Ayyalasomayajula, P.K. Mutnuri, K. Ghia and U. Ghia

The spectral volume method for the Euler equations with high-order boundary representations
Z.J. Wang

The CE/SE method – a conservative compact integral scheme for computational aeroacoustics
C.Y. Loh, L.S. Hultgren

Wednesday 4:30pm – End

Application of compact finite differences methods to numerical simulation of a non-isothermal turbulent jet
F. Garnier and C.F. Gago

Finite volume formulation of compact upwing and central schemes with artificial selective damping
S. Smirnov, J. Ramboer and C. Lacor

High-order compact schemes with filters on multi-block domains
X. Zhang, G.A. Blaisdell and A.S. Lyrintzis

Application of compact schemes to LES of turbulent jets
A. Uzun, G.A. Blaisdell and A.S. Lyrintzis

76 - Simulation models for environmental systems

Chairpersons: Y.P. Sheng, K.M. Barry and J. Davis
Room: 66-160
**denotes key-note presentation*

Thursday 11:00am – 12:30pm
Chairperson: Y.P. Sheng

Time-dependent wave forcing in computational nearshore hydrodynamics
A.B. Kennedy, F. Shi and J.T. Kirby

A comparison of advection schemes in variable-density, highly conductive, ground water domains
J.N. King and Y.P. Sheng

Fitting topography and shorelines in a 3-D, Cartesian-grid model for free-surface flows
X.J. Chen

Thursday 2:00 – 4:00pm
Chairperson: Y.P. Sheng

***Advances in modeling of estuarine and coastal environments**
Y.P. Sheng

Combining parallel techniques for ecosystem modeling and management
J.R. Davis

Parallel framework for numerical modeling of the problems described by hyperbolic equations. Applications in atmosphere flows modeling
L.M. Kraginsky and A.M. Oparin

Modelling hydrodynamics of Irish sea
T. Dabrowski, M. Hartnett and A. Berry

Thursday 4:30pm – End
Chairperson: J. Davis

Estimation of tidal current using Kalman filter finite element method with AIC
R. Suga, K. Yonekawa and M. Kawahara

Wind-waves and atmospheric shear stress in ultra-shallow water (<2m)
A.M. Teeter

Effects of the mass transfer process in the numerical model for oil spill during short time test
F.O. Betancourt, A. Palacio and A. Rodríguez

Friday 11:00am – 12:30pm
Chairperson: A.J. Mehta

Dynamics of turbulent wakes behind self-propelled and towed bodies in stratified media
G.G. Chernykh, N.P. Moshkin and O.F. Voropayeva

Mathematical modeling of crown forest fire
V.A. Perminov

A numerical model for river flows simulation in a Lagrangian reference frame
B.H. Devkota and J. Imberger

Friday 2:00 – 4:00 pm
Chairperson: A.J. Mehta

Three-dimensional modeling of sediment transport in a partially stratified micro-tidal estuary
E.J. Hayter and V.A. Paramygin

Modeling wind-wave resuspension in a shallow reservoir: Peoria Lake, IL
A.M. Teeter and E.P. Best

Quasi-hydrodynamic lubrication effect of clay particles on sand bed erosion
K.M. Barry and A.J. Mehta

77 - Electro-magneto-mechanics of smart material systems and structures

Chairpersons: Y. Shindo, M.C. Dökmeci and J.-Q. Tarn
Room: 2-135
**denotes key-note presentations*

Thursday 11:00am – 12:30pm

Electro-elastic stress analysis for a Zener-Stroh crack at the interfaces of piezoelectric material bonding to a metal
Z.M. Xiao and J.F. Zhao

Assessment of a layerwise theory of hybrid beams for patch load
S. Kapuria, P.C. Dumir and A. Ahmed

Two-dimensional numerical simulations of magnetic domains in ferromagnetic microstructures
M. Bernadou, S. Depeyre, S. He and P. Meilland

Thursday 2:00 – 4:00 pm

***Electroelastic bending and polarization switching of piezoelectric laminated actuators**
F. Narita, Y. Shindo, K. Hayashi and M. Yoshida

Dynamic shape control of sub-regions of linear elastic beams by self-stress actuation
M. Krommer

Nonlinear vibration of thermo-elastic plates in a magnetic field
L. Librescu, D. Hasanyan, Z. Qin and D.R. Ambur

Variational fundamental equations for some electromagnetic elastic discontinuous fields
G.A. Altay and M.C. Dökmeci

Thursday 4:30pm – End

***The state vector method of axisymmetric problems for multilayered magneto-electro-elastic media**
J. Wang, B. Chu, G. Ding and Y. Shen

A state-space computational model for piezothermoelasticity
J.-Q. Tarn

Mechanics of pre-stressed and pre-polarized piezoelectric single crystals: stability issues
E. Baesu and F. Liu

79 - Advances in boundary element methods

Chairpersons: J. Sladek, F. Duddeck and O. Steinbach
Room: 2-147

Tuesday 11:00am – 12:30pm

A simple technique for efficient evaluations of boundary integrals of time-harmonic elastodynamic BEM analyses for anisotropic solids
T. Matsumoto, M. Tanaka and Y. Ogawa

Transient heat conduction analysis in 3-D axisymmetric body by the meshless local boundary integral equation method
J. Sladek, V. Sladek and Ch. Zhang

Tuesday 2:00 – 4:00pm
Session: *Multipole methods and their industrial applications* (I)
**denotes key-note presentation*

***Fast boundary element methods in industrial applications**
O. Steinbach

Fast multipole method for low-frequency electromagnetic scattering
E. Darve and P. Havé

Fast multipole method for acoustic radiation problems in three dimensions
S. Schneider

Tuesday 4:30pm – End
Session: *Multipole methods and their industrial applications* (II)

Acceleration of 3D crack growth simulations by the compression of BEM-matrices via multipole methods
K. Kolk and G. Kuhn

A parallel implementation of the new version of FMM for elastostatics
K. Yoshida and N. Nishimura

Magneto-mechanical simulations by a coupled fast multiple method – finite element method
A. Frangi, P. Faure-Ragani and L. Ghezzi

A fast multipole boundary element method for the symmetric boundary integral formulation in linear elastostatics
G. Of

Wednesday 11:00am – 12:30pm

A numerical approach based on the BEM for computing transferred earth potentials in grounding analysis
I. Colominas, F. Navarrina and M. Casteleiro

Boundary element methods for highly convective unsteady flows
G.F. Dargush and M.M. Grigoriev

BEM formulation for thermomechanical analysis of ring-on-ring sliding contact
C.-H. Wang, A. Soom and G.F. Dargush

Wednesday 2:00 – 4:00pm

Dynamics stiffness of foundations embedded in anisotropic half spaces
C. Song

Weighted traction boundary element methods for strength analysis of bi-materials
A.R. Hadjesfandiari and G.F. Dargush

An efficient multi-level boundary element method for the Helmholtz equation
M.M. Grigoriev

Wednesday 4:30pm - End

Finite element method and conformal mapping
A.R. Hadjesfandiari

80 - Mechanical modeling of soft biological tissue

Chairpersons: S. Socrate, M.C. Boyce, P. Fischer and S. De
Room: 4-370

Thursday 4:30pm – End

A stereologic technique to quantify the specific hydraulic conductivity of extracellular matrix using electron microscopy
D. Overby and M. Johnson

FE implementation of Fung elastic model for planar anisotropic biological materials
W. Sun, M.J. Scott and M.S. Sacks

A continuum treatment of growth in soft biological tissue: Coupling of mass transport and mechanics
H. Narayanan, E.M. Arruda, S.C. Calve, K. Grosh and K. Garikipati

Friday 11:00am – 12:30pm

Modeling a piezoelectric biological membrane
A.A. Spector

A finite deformation theory for articular cartilage with orthotropic symmetry and tension compression nonlinearity
I.M. Basalo, B. Cohen and G.A. Ateshian

Natural strain has advantages for biotissue models and can be quickly and accurately approximated
J.C. Criscione

Friday 2:00 – 4:00pm

Biomechanical modeling of cervical incompetence
S. Socrate

A compressible anisotropic nonlinear elastic material. Application to the finite element modeling of the periodontal ligament
G. Limbert and J. Middleton

Numerical modelling of bioheat transfer in multi – layer skin tissue domain subjected to a flash fire
E. Majchrzak, B. Mochnacki and M. Jasiński

81 - Educational issues and aspects for computational fluid and solid mechanics

Chairpersons: J.W. Bull and J.W.Hong
Room: 2-135

Friday 11:00am – 12:30pm

Analysis building blocks – a rich information model context for knowledge-based finite element analysis
S. Zeng, R.S. Peak, M.W. Wilson, R. Matsuki and A. Xiao

A parallel, open-source, internet-enabled computational mechanics simulation platform
K.L. Wong, S.C. Ericson and A.J. Baker

An approach to teaching mechanics to students in design and architecture utilizing a computational mechanics software
G. Sandberg, J. Lindemann and K.-G. Olsson

Friday 2:00 – 4:00pm

Existing and future directions of the self-designing structures optimization research programme
J.W. Bull

82 - Advances in computational dynamics

Chairpersons: J.W. Tedesco, M. Borri and F. Pfeiffer
Room: 2-135
**denotes key-note presentation*

Tuesday 11:00am – 12:30pm

***An index reduction method in holonomic system dynamics**
M. Borri, L. Trainelli and A. Croce

Design of a low-profile barrier for curved alignments using finite element impact simulation
G.R. Consolazio, J.R. Wilkes, K.R. Gurley and J.H. Chung

Nonlinear numerical dissipative elastodynamics of an optimal solid shell element
X.G. Tan and L. Vu-Quoc

Tuesday 2:00 – 4:00 pm

Prediction of lateral impact loads imparted to bridge piers during barge collision events
G.R. Consolazio, D.R. Cowan and G.B. Lehr

Higher-order MDOF time integration methods
B.T. Rosson and C.W. Keierleber

A spectrally formulated finite element for analysis of wave propagation in layered composite media
A. Chakraborty and S. Gopalakrishnan

Nonlinear seismic response of a soil deposit using the Volterra series
J.R. Arroyo and L.E. Suárez

Tuesday 4:30pm – End

Operational dynamic testing in the presence of harmonic excitation
P. Mohanty and D.J. Rixen

Numerical dispersion of SH waves in the thin-layer method
J. Park and E. Kausel

An added mass identification algorithm based on frequency response functions
E.P. Carden and P.J. Fanning

Bridging time-scales in solid dynamics: asynchronous variational integrators
A. Lew and M. Ortiz

Subdomains assembly with non matching time space interfaces: an efficient way to solve large structural transient analysis
A. Combescure, A. Gravouil, B. Herry and V. Faucher

Wednesday 11:00am – 12:30pm

Algorithms by design: issues and new perspectives for computational dynamics
K.K. Tamma, X. Zhou and R. Kanapady

Modeling of unbounded media with concave finite elements using the cloning algorithm
E.A. Malsch and G. Dasgupta

Study of floor acceleration demands in moment frame structures
S. Taghavi and E. Miranda

Wednesday 2:00 – 4:00 pm

Multigrid methods in dynamic structural analysis
Y. Wang and G.F. Dargush

Conservation laws in elastodynamics of anisotropic non-homogeneous bodies
W. Shi

The FETI-P methods applied to multiple right-hand side problems and implicit dynamic analysis in structural mechanics
Y. Fragakis and M. Papadrakakis

Collision of vehicles with bridge piers
E. Severino and S. El-Tawil

Wednesday 4:30pm – End

A primal-dual constraint and order preserving technique for flexible multibody dynamical index-3 systems
R. Kanapady, S.S. Sandhu and K.K. Tamma

Collisions of rigid bodies, deformable bodies and fluids
E. Dimnet, M. Frémond, R. Gormaz and J. San Martín

Simulation of air pressure control valves for crankcases
M. Foerg, F. Borchsenius and F. Pfeiffer

On unilateral roller coasters
F.G. Pfeiffer

84 - Computational micromechanics of biological materials

Session held in honor of Sidney Lees

Chairpersons: F.-J.Ulm and C. Hellmich
Room: 26-314

Thursday 2:00 – 4:00pm

Modeling of trabecular bone as a hierarchical material
I. Jasiuk

Bone structure and mechanical loading: basic science and clinical implications
R. Huiskes and B. van Rietbergen

Role of nanostructure on mechanical properties of nacre
D.R. Katti and K.S. Katti

Scale transitions in bone elasticity from the nanometer level up to cortical and trabecular bone
B. Hellmich and F.-J. Ulm

Thursday 4:30pm – End

Bone and joints modelling with individualized geometric and mechanical properties derived from medical image. Application to the evaluation of osteoarticular pathology
M.C. Ho Ban Tho

Structure modification of collagen associated with mineral and water content
S. Lees

Mechanical aspects of bone remodeling
A. Meunier

Development of a finite element tool for stress analysis of femur and tibia incorporating anatomically realistic mechanical properties
A.G. Au, D.D. Otto, V.J. Raso and A. Amirfazli

88 - Models and methods for biological fluid dynamics and related problems with immersed boundaries

Chairpersons: X. Wang, C.S. Peskin and Y. Kim
Room: 2-105

Thursday 11:00am – 12:30pm

On various techniques for computer simulation of boundaries with mass
Y. Kim, L. Zhu, X. Wang and C. Peskin

On deriving lumped models for blood flow and pressure in the systemic arteries
M.S. Olufsen and A. Nadim

Immersed boundary simulation of the cochlea: recent results
E. Givelberg

Thursday 2:00 – 4:00pm

Three-dimensional numerical simulation of flow in a bileaflet heart valve using overset grids
L. Ge, S.C. Jones, F. Sotiropoulos, T. Healy and A.P. Yoganathan

Numerical simulation of aquatic locomotion on Cartesian grids
A. Gilmanov and F. Sotiropoulos

Incorporating thermal fluctuations into the immersed boundary method
P.R. Kramer and C.S. Peskin

On the discretized delta function and force calculation in the immersed boundary method
X. Wang

Thursday 4:30pm – End

Subcritical bifurcation of a rotating elastic filament in a viscous fluid by the immersed boundary method
S. Lim and C.S. Peskin

A study of steady and unsteady flow in a collapsible channel
J. Zhu and X. Wang

A coupling of mixed and Galerkin finite element methods for poro-elasticity
M.F. Wheeler and P.J. Phillips

90 - Neural networks and soft methods in computational mechanics

Chairpersons: Z. Waszczyszyn and J.E. Hurtado
Room: 2-147

Thursday 2:00 – 4:00pm

Implicit material modeling for temperature-dependent viscoplasticity using multi-layer neural networks
T. Furukawa, S. Yoshimura and M. Hoffman

Neurocomputing and experimental structural mechanics: some new results
Z. Waszczyszyn and L. Ziemiánski

Neural networks in computational damage mechanics
B. Mariani, P. Venini and R. Nascimbene

Quantifying uncertainty in predictions using a Bayesian neural network
A.T.C. Goh and C.G. Chua

Thursday 4:30pm – End

Genetic generation of 2-D and 3-D structures
T. Burczyński, A. Poteralski and M. Szczepanik

Relevance of support vector machines for stochastic mechanics
J.E. Hurtado

An intelligent finite element method for analysis of geotechnical problems
A.A. Javadi, T.P. Tan and M. Zhang

Artificial neural networks prediction of soil geomechanical parameters using "NEUROSOIL" software
F. Dadfar

91 - Coupling of geomechanics and fluid flow in porous media

Chairpersons: R.H. Dean and A.G. Malan
Room: 26-204

Thursday 2:00 – 4:00pm

Two-way coupling of a nonlinear geomechanics code with several porous flow simulators
C.M. Stone, S.E. Minkoff, S.W. Webb and S.R. Sobolik

Cavity generation for enhanced well productivities
R.H. Dean

Continuum thermodynamic modeling of drying capillary particulate materials using an unstructured finite volume algorithm
A.G. Malan and R.W. Lewis

A constitutive model for a three-phase-porous material
R. Tamagnini

Thursday 4:30pm – End

A variational approach-based method for simulating the post-liquefaction behaviour of soil masses
S. Montassar, P. de Buhan, L. Dormieux and M. Jellouli

A multiple-porosity finite-element model of reactive contaminants in soils
A. El-Zein and J. Carter

Diffusion in poro-inelastic media
R.E. Showalter

Numerical solution of Thermo-hydro-mechanical analysis of porous media
Z. Bittnar, T. Krejčí and J. Kruis

Friday 11:00am – 12:30pm

Simultaneously determining of the hydraulic properties of porous media
A.G. Fatullayev

Formulation and study of thermal-mechanical coupling for saturated porous media
X. Wang and J. Dong

Convection of multi-component fluid in porous medium
O.Y. Kantur

92 - Frontier of multi-phase flow analysis and fluid-structure interaction

Chairpersons: T. Yabe and M. Sussman
Rooms: 2-142
**denotes key-note presentation*

Tuesday 11:00am – 12:30pm

Volume tracking algorithms: Where do we go from here?
D.B. Kothe

Fictitious domain approach to the direct numerical simulation of the ellipsoid setting in incompressible viscous fluids
R. Glowinski and T.-W. Pan

IVA_5M numerical method for analysis of three-fluid multi-component flows in boundary-fitted multi-blocks
N.I. Kolev

Tuesday 2:00 – 4:00pm

An adaptive coupled level set and volume-of-fluid method for computing growth and collapse of vapor bubbles in general geometries
M. Sussman

A multi-integrated moment method for multi-fluid hydrodynamics
F. Xiao and A. Ikebata

Numerical scheme for moving body interacting with fluid
T. Aoki

Simulating free surface flows with the particle Level Set method
R. Fedkiw

Tuesday 4:30pm - End

Direct numerical simulations of flows with phase change
G. Tryggvason, A. Esmaeeli and N. Al-Rawahi

DNS falling film structure and heat transfer via MARS method
T. Kunugi

***Conservative semi-Lagrangian CIP method for multi-phase flow**
T. Yabe

A new Lagrangian-Eulerian shell-fluid coupling algorithm based on level sets
F. Cirak and R. Radovitzky

93 - Computational modelling of biological pattern formation

Chairpersons: X.S. Yang and B.M. Boghosian
Room: 2-136

Wednesday 2:00 – 4:00pm

Stationary and traveling waves on the skin of animals
S. Kondo

Finite element modelling of pattern formation and calcium waves
X.-S. Yang

Pattern formation by local ativation and long range inhibition in social insects
G. Theraulaz

94 - Simulation of optimal metal forming processes

Chairpersons: J. Zarka, K. Mori and R. Toscano
Room: 26-302

Thursday 11:00am – 12:30pm

Sensitivity analysis of solidification process using the boundary element method (the micro-macro approach)
B. Mochnacki and E. Majchrzak

The sensitivity of continuous casting solidification with respect to boundary conditions
R. Szopa and B. Mochnacki

Novel approach for identification of the thermal resistance of the gas-gap between the ingot and mould in the continuous casting of metals
A. Nawrat and J. Skorek

Thursday 2:00 – 4:00pm

Master / slave algorithm for contact between deformable bodies and axial symmetries – applications to 3D metal forging
L. Fourment, J. Barboza and S. Popa

Effects of microstructural evolution on the stability of superplastic deformation
N.V. Thuramalla and M.K. Khraisheh

Object-oriented programming for "fast-and-easy" development of parallel applications in forming processes simulation
H. Digonnet and T. Coupez

Coupled thermo-mechanical simulation of open die forging
P. Lacki

Thursday 4:30pm – End

Numerical simulation of thermal stability in NHMFL 45-T hybrid magnet using front-tracking method
S. Mao, C.A. Luongo and J.R. Miller

Hydroforming prediction for aluminum tubes formed within a conical die
B.N. Nguyen, K.I. Johnson, G.J. Grant and M.A. Khaleel

Finite element analysis modeling of ingot refusal conditions during the rolling process
R. Ognjanovic, K. Waterson

Friday 11:00am – 12:30pm

Parallel processing for 3-D rigid-plastic finite element method using diagonal matrix
K.Mori, H. Yoshimura and Y. Otomo

Finite element simulation of hammering hydroforming of tubes
K. Mori, A.U. Patwari and S. Maki

Experimental validation of a finite element model that simulates the collapse and post-collapse behavior of steel pipes
R.G. Toscano, M. Gonzalez and E.N. Dvorkin

97 - Flows with free-surfaces/interfaces

Chairpersons: T. Yabe, W. Cheng and J. Zhang
Room: 66-160

Wednesday 11:00am – 12:30pm

A three-dimensional non-hydrostatic numerical model of free-surface stratified flows
Y. Kanarska

Wednesday 2:00 – 4:00 pm

Longitudinal sloshing effects in half full horizontal cylindrical vessels
S. Papaspyrou, D. Valougeorgis and S.A. Karamanos

A numerical strategy for accurate free surface capturing
A. Malidi and S. Dufour

An irrotational/vortical split-flow approach to viscous free surface flow
T.E. Kendon, S.J. Sherwin and J.M.R. Graham

An MLSPH algorithm for free surface flows in engineering applications
L. Cueto-Felgueroso, I. Colominas, G. Mosqueira, F. Navarrina and M. Casteleiro

Wednesday 4:30pm – End

Computational simulation of a single boiling bubble in water
J. Zhang and R.M. Manglik

Improvement of volume-of-fluid methods and reconstruction of continuous three-dimensional surfaces of liquid
S. Liu, H. Lv and Y. Chen

98 - Advanced analysis of concrete structures

Chairpersons: W. Wagner and G.R. Consolazio
Room: 2-143

Friday 11:00am – 12:30pm

Flexural analysis of concrete retaining walls on rough elastic half-space
E.S. Melerski

A 3D-plasticity model for the description of concrete and its 3D-FE-implementation
J. Schütt and W. Wagner

Moisture movement and heat flow in reinforced concrete columns exposed to fire
J.H. Chung and G.R. Consolazio

Friday 2:00 – 4:00pm

Thermo-mechanical analysis of solidifying concrete slab of a bridge
S. Yoshida and S. Endo

Damage model for concrete under multiaxial stress state
M. Cuomo

Nonlinear finite element analysis of prestressed concrete members using ADINA
M. Kawakami and T. Ito

100 - Computational insights in material models

Chairpersons: F.J. Montans and L. Noels
Room: 26-322

Wednesday 2:00 – 4:00pm

A new formulation of internal forces for non-linear hypoelastic constitutive models verifying conservation laws
L. Noels, L. Stainier, J.-P. Ponthot and J. Bonini

On the different behaviour of porous ceramic polycrystalline materials under tension and compression stress state
T. Sadowski and S. Samborski

Large strain time- and temperature-dependent modeling of PTFE
J.S. Bergström, L.B. Hilbert and S.B. Brown

Application of conjugate stresses and strains for hyper-elastic constitutive equations
K. Farahani and H. Bahai

Wednesday 4:30pm – End

Plastic constitutive equations of bulk amorphous alloy
L. Liang, D. Chen and H. Song

On the constitutive modeling and experimental detection of macroscopic plastic spin in orthotropic sheet metals
W. Tong, H. Tao and X. Jiang

The analysis of plastic shear appearing in metals near stress concentrators
S. Veselkov

On the stress integration in large strain elasto-plasticity
F.J. Montáns and K.J. Bathe

101 - Methods of analysis for contact problems

Chairpersons: K.K. Tamma, A.J. Barlow and F. Cirak
Room: 2-146

Friday 11:00am – 12:30pm

Application of conjugate projected gradient method to large-scale contact problems
T. Miyamura and A. Makinouchi

A forward incremental displacement semi-explicit unconditionally stable dynamic frictional contact-impact formulation
X. Zhou, K.K. Tamma and D. Sha

Finite element modeling of nonlinear frictional instability between deformable bodies
H.L. Xing and P. Mora

Friday 4:30pm – End

Parallel finite element computation of contact-impact problems with large deformations
F. Cirak, M. West, S. Mauch and R. Radovitzky

Structured deformation of damaged continua with cohesive-frictional sliding rough fractures
M. François and G. Royer-Carfagni

103 - Innovative numerical methods

Chairpersons: F. Duddeck, O. Steinbach and P. Fischer
Room: 26-210

Tuesday 11:00am – 12:30pm

Diffusion in cylindrically layered materials using the thin-layer method
A.E. Joanni and E. Kausel

Radiation phenomena in unbounded media – a fractional calculus approach
C. Trinks and P. Ruge

Agglomeration coarse corrections: convergence estimate and numerical results
M. Sala

Tuesday 2:00 – 4:00pm

A fast multi-level multi-grid method for the Laplace equation
M.M. Grigoriev and G.F. Dargush

An implicit WENO scheme for steady-state computation of scalar hyperbolic equations
S. Gottlieb and J.S. Mullen

Genetic algorithms applied to partitioning for parallel analyses using geometric entities
R. Obiala, P. Iványi and B.H.V. Topping

An analytically integrated general finite element method
R. Tian and Y. Ohnishi

Tuesday 4:30pm – End

Implicit high-order geometrically conservative scheme for the solution of flow problems on moving unstructured grids
I. Lepot, D. Vigneron, J.-A. Essers and O. Léonard

The piecewise full decoupling method-an extension of piecing the exact solutions
N. Kranjčević, M. Stegić and N. Vranković

A penalty-based interface technology for coupling independently modeled three-dimensional finite element meshes
A. Pantano and R.C. Averill

Application of the FETI-DP method on coupled linear-nonlinear large scale problems
J. Sun and P. Michaleris

Wednesday 11:00am – 12:30pm

A discrete vector calculus in tensor grids
N. Robidoux and S. Steinberg

Algorithm of calculation of Lyapounov coefficients for analysis of chemical auto-oscillations, as applied to calcite crystallization model
N. Bryksina

Computational models on graphs for nonlinear hyperbolic and parabolic system of equations
A.S. Kholodov and Y.A. Kholodov

Wednesday 2:00 – 4:00pm

On displacement control within the DIRK/MLNA approach in non-linear finite element analysis
S. Hartmann

External forcing terms in energy-conserving based time integration algorithms
P.B. Bornemann and U. Galvanetto

A fractional time step method for solid dynamics
S.K. Lahiri, J. Bonet and J. Peraire

A sixth order finite difference scheme for the convection diffusion equation
J. Zhang and H. Sun

Wednesday 4:30pm – End

Asymptotically symplectic integrators of 3rd and 4th order for the numerical solution of the Schrödinger equation
Z. Kalogiratou, Th. Monovasilis and T.E. Simos

Computation of electromagnetic problems by the R-functions method
Y.S. Semerich

104 - Error prediction/control in FEM

Chairpersons: T. Grätsch and V. Bostan
Room: 2-147

Friday 11:00am – 12:30pm

Simultaneous upper and lower bound error assessment solving local problems on stars
N. Parés, P. Díez and A. Huerta

A posteriori error analysis for elliptic variational inequalities of the second kind
V. Bostan, W. Han and B.D. Reddy

Improved accuracy in finite element methods using fundamental solutions
T. Grätsch and F. Hartmann

Friday 2:00 – 4:00pm

Control of discretization error for time-continuous space-time FEM through mesh movement
P. Tremblay, Y. Bourgault and S. Tavoularis

A simple 3D local error estimator for stresses
E. Florentin, L. Gallimard, P. Ladevèze, J.P. Pelle and Ph. Rougeot

Certifying results from finite element approximations of linear partial differential equations
A.M. Sauer-Budge and J. Peraire

120 - Recent advances in analysis and numerics for fluid dynamics problems

Chairpersons: H. Liu and B. Wade
Room: 66-156
**denotes key-note presentation*

Thursday 11:00am – 12:30pm

***Rigorous characterization of boundary layer separations**
T. Ma and S. Wang

Approximation of singular concentration in compressible flows
H. Liu

Plain Galerkin schemes that work well for the advection-diffusion problem
C.L. Bottasso and D. Detomi

Thursday 2:00 – 4:00 pm

***Analysis and numerics for multiphase flow in porous media**
Z. Chen

Kinematic and dynamic dissipation in shock capturing schemes
K. Xu

Regularization formulations and explicit temporal discretization for the incompressible Navier-Stokes equations
P. Lin

An energetic variational formulation in elastic complex fluids
C. Liu

Thursday 4:30pm – End

Implementation of strength models in the Eulerian Godunov framework
I. Lomov

Hybrid WENO-central schemes based on multiresolution decomposition
B.L. Bihari, W.S. Don, L. Jameson and O. Schilling

A second order modeling of a stably stratified turbulence submitted to non vertical shear
M. Bouzaiane, H.B. Abdallah and T. Lili

121 - Advanced applications in computational fluid and solid mechanics with established software

Opening Remarks: K. J. Bathe
Room: 10-250

Tuesday 11:00am – 12:30pm

MSC Software session (I)
Chairpersons: R.S. Sadeghi and S. Borgersen
**denotes key-note presentation*

***Explicit, coupled Euler/Lagrange method with adaptive Euler domains**
R.S. Sadeghi and W.A. van der Veen

Simulation of cold-working process in MSC.Marc: roller-burnishing
S.R. Voleti

FEA simulation of drive shaft fabrication for rotational atherectomy devices
S. Borgersen and S. Reddy

Tuesday 2:00 – 4:00pm

ESI session (I)
Chairpersons: P. Bremner and E. Haug
**denotes key-note presentation*

***Integration strategies in PAM-CRASH 2G**
P. Culière , J.-L. Duval, A. Kamoulakos and E. Gai

Finite point set method: a mesh free approach to model airbag inflation with PAM-SAFE
A. Trameçon , G. Pierrot, P. Culière, E. Gai and J. Kuhnert

PAM-STAMP 2nd generation answers industry requirements in sheet metal stamping simulation for the next decade
E. El Khaldi and B. Rodewald

Integrated software chain for the simulation of composite materials with PAM-FORM
P. de Luca and O. Morisot

Tuesday 4:30pm - End

ESI session (II)
Chairpersons: E. Haug and P. Bremner

Possibilities of numerical simulation for evaluation and optimization of welded designs and heat treatment processes with SYSWELD
H. Porzner and Y. Gooroochurn

Low-mach aerodynamic noise theory and its application to car wind noise prediction with PAM-FLOW/AUTOSEA
M. Zhu and P. Bremner

The challenge of numerical electro-magnetic compatibility with PAM-EMC
J.-C. Kedzia and E.Bot

Finite element human models for passive safety, comfort and medical applications with PAM-SAFE
N. Montmayeur, M. Beaugonin , C. Marca, E. Haug, E.Gai, and H.-Y. Choi

Wednesday 11:00am – 1:00pm

MSC Software session (II)
Chairpersons: R.S. Sadeghi and S. Borgersen

Testing of rubber and thermoplastic materials for FEA
K. Zhang

A novel technique in solving interference fit problems
S. Reddy

Full vehicle dynamic analysis using automated component modal synthesis
P.J. Schartz and W. Nack

NVH optimization using MSC.Nastran
D. Chou

Wednesday 2:00 – 4:00pm

ADINA session (I)
Chairpersons: J. Walczak and N. Elabbasi

On FSI assessments in the Swedish nuclear power industry
L. Andersson and J. Sundqvist

Mecalog session (I)
Chairpersons: F. Arnaudeau and F. Périé
**denotes key-note presentation*

***Automotive safety development and crash assessment using virtual prototyping**
N.K. Saha

Stress computations of machine parts in a mechanism
Y.Q. Liu and B. Khatib-Shahidi

Development, implementation and evaluation of F.E. human body models for virtual testing of real-life crash scenarios
K. Kayvantash, L. Thollon, C. Brunet and P.-J. Arnoux

Wednesday 4:30pm - End

Mecalog session (II)
Chairpersons: F. Arnaudeau and F. Périé

Development of the exhaust systems radiation noise simulation technology
M. Sakurai, M. Endo and F. Périé

Recent computational aero acoustic developments and industrial applications with RADIOSS-CFD
D. Nicolopuolos and F. Périé

Recent developments in the RADIOSS software
F. Arnaudeau

Thursday 11:00am – 12:30pm

ADINA session (II)
Chairpersons: J. Walczak and N. Elabbasi

Development and practical use of computer-aided simulation methods in the automotive lighting industry using the ADINA system
F.K. Hilburger, C.T. Halgren and E.J. Bates

Finite element modeling of bolts in a multibody vehicle chassis assembly
N. Ola, W. Larsen and Y.K. Ken Liao

Thursday 2:00 – 4:00pm

FLUENT session (I)
Chairpersons: S.H. Rhee and A.G. Dixon

CFD simulation of vapor dispersion from a gasoline spill for explosion mitigation
J. Alston, J. Tubbs and C. Wood

Numerical simulation of vortex ring formation in the presence of background flow with implications for squid propulsion
H. Jiang and M.A. Grosenbaugh

Fluent application to flow around a marine propeller
S.H. Rhee and S. Joshi

Applications of FLUENT for MIT micro-engine project
Y. Gong, B. Sirakov, C. Spadaccini and J. Lee

Thursday 4:30pm - End

FLUENT session (II)
Chairpersons: S.H. Rhee and A.G. Dixon

Discrete particle modeling of fixed bed gas-solid catalytic reactors using FLUENT
A.G. Dixon and M. Nijemeisland

From bunker to stack: the cost-reduction and problem-solving benefits of computational fluid dynamics for utility and industrial power generation
K.R. Hules and A. Yilmaz

Airblast atomizer modeling: a cooperative development program
D.P. Schmidt, L.M. Chiappetta, G.M. Goldin and R.K. Madabhushi

The making of a virtual wind tunnel
K.C. Horrigan, H.J. Richter and J.B. Braun

Computational investigation of flow around filter in cross flow arrangement
M.H. Al-Hajeri

Friday 11:00am – 12:30pm

ANSYS CFX session (I)
Chairpersons: A. Rao and S. Elias

Transient heat transfer in layered composites with random geometry
M. Kamiński and M. Pawlik

Fluid-solid interaction analysis using ANSYS/multiphysics
A. Rao

An axial-flow blood pump with a fully magnetically suspended impeller: the use of experimentally validated computational fluid dynamics (CFD) in designing an axial-flow blood pump in order to achieve low hemolysis and thrombus formation rates
P. Nüsser, K. Graichen, J. Müller, H.E. Peters, A. Arndt, F. Deus, J. Hoffmann, H. Heinze, W. Neumann, L. Szpitalny and P. Göttel

Friday 2:00 – End

ANSYS CFX session (II)
Chairpersons: A. Rao and S. Elias
**denotes key-note presentation*

***Innovative technologies in CFX software**
S. Elias

Modelling and simulation of the disintegration process in an ultrasonic standing wave atomizer
N. Lessmann, D. Bothe and H.-J. Warnecke

Experimental and theoretical rotordynamic coefficients of labyrinth seals: a comparison of SEAL2D/3D and CFX-Tascflow models to experiments
J. Schettel and R. Nordmann

Numerical simulation of transient pulsation wave in fuel injection rails
R. Roberts and J. Cui

CFD simulation of a centrifugal compressor stage
B. Srivastava, Z. Moussa and C. Wallis