9th US National Congress on Computational Mechanics

San Francisco, California
July 22-26, 2007

9th U.S National Congress on Computational Mechanics
July 22-26, 2007

Sunday		
8:00 am - 9:00 pm	9:00 am - 4:00 pm	6:00 pm - 9:00 pm
Registration	Short Courses	Reception

Monday									
7:00 am - 5:30 pm	8:00 - 8:15 am	8:15 - 9:15 am	9:15 - 9:45 am	9:45 - 11:35 am	11:35 - 1:00 pm	1:00 - 2:00 pm	2:10 - 4:00 pm	4:00 - 4:30 pm	4:30 - 6:20 pm
Registration	Opening Remarks	Plenary Lecture	Coffee Break	Morning Session	Lunch Break	Plenary Lecture	Afternoon Session	Coffee Break	Evening Session

Tuesday									
7:00 am - 5:30 pm	8:00 - 8:15 am	8:15 - 9:15 am	9:15 - 9:45 am	9:45 - 11:35 am	11:35 - 1:00 pm	1:00 - 2:00 pm	2:10 - 4:00 pm	4:00 - 4:30 pm	4:30 - 6:20 pm
Registration	Opening Remarks	Plenary Lecture	Coffee Break	Morning Session	Lunch Break	Plenary Lecture	Afternoon Session	Coffee Break	Evening Session

Wednesday									
7:00 am - 4:00 pm	8:00 - 8:15 am	8:15 - 9:15 am	9:15 - 9:45 am	9:45 - 11:35 am	11:35 - 1:00 pm	1:00 - 2:00 pm	2:10 - 4:00 pm	4:00 - 4:30 pm	4:30 - 6:20 pm
Registration	Opening Remarks	Plenary Lecture	Coffee Break	Morning Session	Lunch Break	Plenary Lecture	Afternoon Session	Coffee Break	Evening Session

Thursday					
8:00 - 10:00 am	8:00 - 8:15 am	8:15 - 10:05 am	10:05 - 10:35 am	10:35 am - 1:10 pm	
Registration	Opening Remarks	Morning Session	Coffee Break	Mid-Morning Session	

Ninth U.S. National Congress on Computational Mechanics

USNCCM9

July 22-26, 2007
San Francisco, California

U.S. Association for Computational Mechanics

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Tarek I. Zohdi, University of California, Berkeley

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M.F. Wheeler	University of Texas, Austin
P. Wriggers	Universitaet Hannover, Germany
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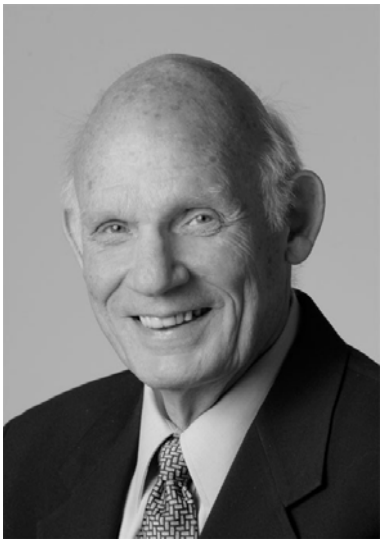
M. Yuan	Beijing University, China

Welcome to the Ninth U.S. Congress on Computational Mechanics



Dear Participants,

On behalf of the organizers and the University of California at Berkeley, it is my pleasure to welcome you to San Francisco and the Ninth U.S. Congress on Computational Mechanics. The theme of this Congress is "Interdisciplinary Computation" and includes more than one-hundred minisymposia and nearly 1,200 papers from contributors around the world.

It has been nearly 50 years since, as a student, I was introduced to what would later become known as the finite element method. My instructor was Professor Ray W. Clough and at that time finite elements were 3-node triangles and digital computers used paper tape input and typewriter output. Between the late 1950's and 1970's Ray Clough and his colleagues at Berkeley were synonymous with study related to finite element analysis. Thus, as we pass the 50th anniversary of the finite element method, it is indeed appropriate that the Ninth Congress be associated with the University of California at Berkeley.

During the week we will be exposed to the vast changes in computational mechanics which have evolved from a subject originally developed to compute structural behavior of "Delta wing" aircraft to the broad fields of engineering and science covered in the Ninth Congress. The interdisciplinary subjects include many related to fluid-structure interaction, multiphysics and bio-mechanics to name a few. I look forward to attending many lectures and learning more about your latest contributions and numerical results. I also look forward to renewing old acquaintances and making new friends during the four days of the Congress. I wish to add my congratulations to Professors Kaspar Willam and Tinsley Oden whose special birthdays we will celebrate this week. Both have contributed greatly throughout the years to the success of the USACM and its previous Congresses. Finally, I wish to thank all of the participants who have contributed to the success of this Congress.

Robert L. Taylor
Professor in the Graduate School
University of California at Berkeley

Information About the Congress

Background and Scope

From their inception in 1991, the biennial congresses of the U.S. Association for Computational Mechanics have become major scientific events, drawing computational engineers and scientists worldwide from government, academia, and industry. The Ninth U.S. National Congress on Computational Mechanics (USNCCM IX), hosted by the University of California, Berkeley, features the latest developments in all aspects of computational mechanics, and broadens the definition of the discipline to include many other computation oriented areas in engineering and sciences. From applications in nanotechnology and bioengineering, to recent advances in numerical methods and high-performance computing, the technical program reflects the Congress theme – "Interdisciplinary Computation". In addition to plenary lectures and minisymposia that highlight the latest trends in computational mechanics, pre- and post-conference short courses addressing advances in multiscale and multiphysics methods, as well as other topics are held.

Location

USNCCM IX is held at the Hyatt Regency San Francisco hotel, located in downtown San Francisco, with convenient access from San Francisco, Oakland and San Jose International Airports.

Registration Fees

Registration for participants: Early ($550), Regular ($650), On-Site ($700)
Registration for students: Early ($350), Regular ($400), On-Site ($450)

The participant fee covers the conference abstracts, a conference program, the reception, banquet, all break refreshments, and a two-year membership in USACM and IACM. The student fee does not include the membership dues.

Program Format

The technical program consists of 6 plenary lectures and over 100 minisymposia, with approximately 1,200 presentations in 250 technical sessions. The program begins each day with a plenary lecture (Grand Ballroom) followed by up to 30 parallel technical sessions. The afternoon program begins with a plenary lecture (Grand Ballroom) followed by two sets of parallel technical sessions. We advise participants to check the memo board, located near the registration booths where any changes to the program will be posted.

Audiovisual Services

Each meeting room is equipped with only an LCD projector. No overheads are provided, thus presentations using transparencies will not be possible. Computers and laser pointers are not provided by the Congress.

We strongly recommend that you check the compatibility of your computer with the projector before the start of your session. To keep the meeting on schedule, any time lost debugging audiovisual problems during your presentation will be deducted from your available time.

Each regular presentation is allotted 20 minutes plus 2 minutes of questions and answers. During the question and answer period, the next presenter is expected to setup their presentation so that no time is lost. Keynote lectures are allotted 40 minutes for the presentation plus 4 minutes for questions and answers.

Author's Preparation Area

Starting Sunday afternoon, presenting authors can test compatibility with the provided audiovisual equipment in the author's preparation area located in the Hospitality room on the Atrium Lobby level, except on Monday when it will be located in Boardroom B. Each session is preceded by a short break; we strongly advise the presenters to use this time to make a final check of their presentation equipment.

Internet Access

Complimentary wireless internet access will be available in the Grand Ballroom Foyer.

Options for Lunch

A large number of restaurants encircle the base of the hotel. In addition, public transportation (BART and MUNI) can take participants throughout San Francisco.
BART: http://www.bart.gov/
MUNI: http://www.sfmta.com/cms/mmaps/official.htm

Airport Shuttle

For transportation to and from the airport participants should use the BART (Bay Area Rapid Transit) system. For more information please visit:
http://www.bart.gov/guide/airport/airport.asp

Special Events

Pre-congress short courses

The following short courses will be available:

Hp-Adaptive Finite Element Methods for Elliptic and Maxwell Problems
L. Demkowicz and J. Kurtz
Location: Seacliff A

Uncertainty Quantification in Mechanics: Theoretical and Computational Aspects
R. Ghanem and C. Soize
Location: Seacliff B

Computational Methods in Cardiovascular Mechanics
C. Taylor and J. Humphrey
Location: Seacliff C

Sunday July 22, 9:00 am - 4:00 pm
Hyatt Regency San Francisco Hotel

Ice Breaker Reception

Sunday July 22, 6:00-9:00 pm at the Hyatt Regency San Francisco Hotel,
Atrium Foyer

Vendor Exhibits

Monday through Thursday 8:00 am-6:30 pm at the Hyatt Regency San Francisco Hotel,
Grand Ballroom Foyer

Conference Banquet

Wednesday July 25, at the Hyatt Regency San Francisco,
Grand Ballroom. Reception 7:00-8:00 pm; Dinner 8:00 pm

Academic Sponsor:

Corporate Sponsors:

Generous Fellowship Contributions by: the National Science Foundation and the United States Association for Computational Mechanics

Plenary Lectures

Plenary Lecture 1: Grand Ballroom, Monday, July 23, 8:15–9:15 am
Computational Failure Mechanics: Recent Advances and Open Issues
Speaker: Kaspar Willam, University of Colorado at Boulder

Plenary Lecture 2: Grand Ballroom A, Monday, July 23, 1:00-2:00 pm
Model VerificationTthrough Strict Upper Error Bounds
Speaker: Pierre Ladevèze, École Normale Supérieure de Cachan

Plenary Lecture 3: Grand Ballroom A, Tuesday, July 24, 8:15–9:15 am
Material Characterization by Multi-Scale Simulations
Speaker: Peter Wriggers, Universität Hannover

Plenary Lecture 4: Grand Ballroom A, Tuesday, July 24, 1:00-2:00 pm
Multiscale Discretizations for Flow, Transport and Mechanics in Porous Media
Speaker: Mary F. Wheeler, The University of Texas at Austin

Plenary Lecture 5: Grand Ballroom A, Wednesday, July 25, 8:15–9:15 am
Finite Element Exterior Calculus: A New Approach to the Stability of Finite Elements
Speaker: Douglas N. Arnold, University of Minnesota

Plenary Lecture 6: Grand Ballroom A, Wednesday, July 25, 1:00-2:00 pm
Equation-Free Modeling and Computation for Complex/Multiscale Systems
Speaker: Yannis G. Kevrekidis, Princeton University

Minisymposia

3. Discontinuous Galerkin Methods for PDEs
Organizers: Slimane Adjerid, Bernardo Cockburn, Krishnan Garikipati, Adrian Lew and Chi-Wang Shu
4. Computational Geomechanics Minisymposium
Organizers: Boris Jeremic, Richard Regueiro, Ronaldo Borja and Stein Sture
5. Failure Mechanisms Under Dynamic Loading
Organizers: David Benson and Rebecca Brannon
6. Symposium on Multiscale Methods and Applications to Nano- and Bio- Mechanics and Materials
Organizers: Wing Kam Liu, Jacob Fish and Dong Qian
8. Multiscale Damage and Failure Mechanics
Organizers: J. Woody Ju, Lizhi Sun, Pierre Ladevèze and Olivier Allix
9. Computational Methods in Biological Growth and Remodeling
Organizers: Krishna Garikipati and Ellen Kuhl
10. Accomplishments and Challenges in Verification and Validation
Organizers: Len Schwer, Bill Oberkampf and Wayne Chen
(Cross-listed and Co-organized with Minisymposium #57.)
12. Computational Acoustics and Computational Ultrasonics
Organizers: Nico F. Declercq
13. Numerical Modelling of Contact Problems in Dynamics
Organizers: Patrick Le Tallec, J. Martins and T. Laursen
14. Stabilized, Multiscale and Multiphysics Methods
Organizers: Arif Masud, Tayfun Tezduyar and Thomas Hughes
15. Multiphysics Behaviors of Materials at the Nanoscale
Organizers: Vikas Tomar and Min Zhou
(Cross-listed and Co-organized with Minisymposium #41.)
16. Advances and Applications of Meshfree and Extended Finite Element Methods
Organizers: Cheng-Tang Wu, Yong Guo, Hui-Ping Wang and Pablo Zavattieri
17. Non-Invasive Sensing of Subsurface Properties
Organizers: David Pardo and Carlos Torres-Verdin
18. Clinical Biomechanics of the Spine: Computational Mechanics Challenges
Organizers: Jenni M. Buckley
19. Computational Biomechanics: From Biomolecules to Organisms
Organizers: Mohammad Mofrad, Gerhard A. Holzapfel and Abdul Barakat
20. Computational Methods in Impact Engineering
Organizers: Ashkan Vaziri, Zhenyu Xue, Vikram S. Deshpande, Horacio D. Espinosa and John W. Hutchinson
21. Contact and Interface Mechanics: Developments and Applications
Organizers: Reese Jones, Mike Puso and Jerome Solberg
22. Computational Geometry and Analysis
Organizers: T.J.R. Hughes, Chandrajit Bajaj, Y. Bazilevs, and V.M. Calo
23. Multidisciplinary Design Optimization - Theory, Methodology, and Application
Organizers: Hongbing (Howie) Fang and Ming Zhou
24. Computational Formulations Involving Shell and Other Thin-Walled Structures
Organizers: Loc Vu-Quoc and Ekkehard Ramm
25. Modeling and Computation of Active Small (Nano) Systems Issues for Small Systems
Organizers: Loc Vu-Quoc, Narayan Aluru and Deepak Srivastava
26. Computational Methods for Fluid-Structure Interaction
Organizers: Trond Kvamsdal, Roger Ohayon and Harald van Brummelen
27. Collapse of Deepwater Pipelines
Organizers: Eduardo N. Dvorkin and Rita G. Toscano
28. Uncertainty Modeling and Quantification in Computational Mechanics
Organizers: Roger Ghanem, John Red-Horse, Gerhart Schueller and Christian Soize
29. Computational Methods in Bioengineering
Organizers: Suvranu De, Mohammad Mofrad and Ashkan Vaziri
30. Numerical Modeling and Simulation on Nanoscale Materials and Devices
Organizers: Ted Belytschko, Shaoping Xiao and Harold Park
31. Computational Methods for Micro and Nano Systems
Organizers: Alberto Corigliano, Horacio Espinosa and Joost Vlassak

32. Inverse Problems
Organizers: Assad Oberai, Gonzalo Feijoo and Paul Barbone
33. Computational Mechanics of Random Media
Organizers: Martin Ostoja-Starzewski and Marcin Kaminski
34. Turbulence Simulation: Methods and Applications
Organizers: Kenneth E. Jansen, Thomas J.R. Hughes, Yuri Bazilevs and Victor M Calo
35. Geometric Time Integrators
Organizers: Eva Kanso
36. Recent Advances in Modeling Functionally Graded Materials
Organizers: Jeong-Ho Kim
40. Computational Mechanics in Geoscience Applications
In honor of Prof. J. Tinsley Oden's 70th birthday
Organizers: Clint Dawson, Mary F. Wheeler and Ivan Yotov
41. Advances in Computational Nanomechanics of Fracture and Plasticity
Organizers: Sulin Zhang, Douglas Spearot, and Ting Zhu
(Cross-listed and Co-organized with Minisymposium #15.)
42. Computational Methods for Solid-Solid Phase Transformations
Organizers: Erwin Stein and Alexander Idesman
(Cross-listed and Co-organized with Minisymposium #69.)
43. Discrete and Finite Element Methods and Applications
Organizers: Scott Johnson, Joseph Morris and John Williams
44. Multiple Scale Modeling in Spatial and/or Temporal Domains: Theoretical and Practical Aspects
Organizers: Somnath Ghosh and Peter Wriggers
(Cross-listed and Co-organized with Minisymposium #48.)
45. Scalable Solution Algorithms for Computational Mechanics
Organizers: Saikat Dey and Charbel Farhat
47. Recent Advances in Modeling of Engineering Materials/Systems
Organizers: S.K. Youn, H.G. Kwak and H.K. Lee
48. Multiple Scale Modeling in Spatial and/or Temporal Domains: Theoretical and Practical Aspects
Organizers: Kenjiro Terada, Somnath Ghosh and Peter Wriggers
(Cross-listed and Co-organized with Minisymposium #44.)
49. Computational Dynamics
Organizers: Greg Hulbert and Kumar Tamma
50. Meshfree and Generalized/Extended Finite Element Methods
Organizers: J. S. Chen, Ivo Babuska, Ted Belytschko, Wing Kam Liu, Hirohisa Noguchi and Sang-Ho Lee
51. Mathematical and Computational Aspects of Multi-scale and Multi-physics
Organizers: Dongbin Xiu, Hirohisa Noguchi, J. S. Chen, Tom Hou and Nasr Ghoniem
52. Recent Developments in Nanoscale Simulations: From Quantum to Coarse-Grained Modeling
Organizers: Shaofan Li, Ju Li and Sukky Jun
53. Computational Methods in Image Analysis
Organizers: Joao Manuel R. S. Tavares, Renato Natal Jorge, Yongjie Zhang and Dinggang Shen
54. Advances in Commercial Finite Element Software
Organizers: Sanjay Choudhry
57. Code and Solution Verification
Organizers: François Hemez, James Kamm and Ryan Maupin
(Cross-listed and Co-organized with Minisymposium #10.)
58. Advances in Solver Technology for Industrial Finite Element Analysis
Organizers: Vladimir Belsky and Harun Bayraktar
59. Shape and Topology Optimization in Computational Mechanics
Organizers: Krishnan Suresh
60. Frontal Phenomena
Organizers: Dmitry Golovaty, Laura Gross and Stephen Margolis
61. Trends in Unstructured Mesh Generation
Organizers: Steven Owen and Mark Shephard
62. Advances in Multi-Modelling, Transmissions and Associated Numerical Methodologies
Organizers: Hachmi Ben Dhia, François-Xavier Roux, Francisco Chinesta and Eduard Karpov
63. Pavement Mechanics and Simulation
Organizers: William Buttlar and John Bolander

65. Advances in Boundary Element Methods
Organizers: Ernie Pan, Yijun Liu, Martin Schanz and Mitsunori Denda
66. Modeling and Simulation of Nano Materials and Mechanics
Organizers: Peter Chung, Eliot Fang, Nasr Ghoniem and Hanchen Huang
67. Asymptotic and Numerical Approaches to Electron and Phonon Transport in Nanowires
Organizers: Lev Baskin, Pekka Neittaanmäki and Boris Plamenevsky
68. The Foundation: The Teaching of Finite Elements at Undergraduate Level
Organizers: Jat du Toit, Mike Gosz and Göran Sandberg
69. Computational Modeling of Phase Transitions
Organizers: Stefanie Reese and Bob Svendsen
(Cross-listed and Co-organized with Minisymposium #42.)
71. Computational Methods in Composite Materials Research
Organizers: Abbas Milani and Christine El-Lahham
73. Structural Stability
Organizers: Herbert Mang and Yeon-Bin Yang
74. Cohesive Models of Fracture, Branching, and Fragmentation
Organizers: Glaucio Paulino, Robert Dodds Jr. and Seong Hyeok Song
75. Mechanics of Living Materials: Experimentation, Modeling and Simulation
Organizers: Antonio DiCarlo and Jay Humphrey
77. New Actuators and Mechanisms
Organizers: Ramiro Velazquez and Ernesto Martinez
78. Intelligent Computing in Mechanics
Organizers: Tadeusz Burczynski and Jacques Periaux
79. Simulation of Non-Gaussian Random Fields: Theory and Applications
Organizers: George Stefanou and Manolis Papadrakakis
80. Computational Aspects of the Stochastic Finite Element Method
Organizers: Manolis Papadrakakis, Vissarion Papadopoulos and Dimos C. Charmpis
81. Algorithms and Implementations in Coupled Engineering Simulation
Organizers: Dennis Parsons, Robert Ferencz and James Stewart
82. Structural Reliability Analysis
Organizers: Seifedine kadry
83. Particle Methods in Continua and Discontinua Mechanics
Organizers: Sergio Idelsohn and Eugenio Oñate
84. Parameter Identification and Experimental Validation
Organizers: Rolf Mahnken
85. Domain Decomposition Techniques for Coupled Problems in Science and Engineering
Organizers: Eugenio Aulisa, Padmanabhan Seshaiyer and Sandro Manservisi
87. Mathematical Developments in Modern Topics in Composite Mechanics
Organizers: Peter Schiavone, Stanislav Potapenko and Christian Constanda
88. Air/Water Flow in Near Surface Environments
Organizers: Matthew Farthing, and Chris Kees
89. Nanoscale Modeling and Simulation in Mechanics of Materials
Organizers: Akihiro Nakatani and Seyoung Im
90. Modeling and Simulations of Multifunctional Nanomaterials
Organizers: Hanqing Jiang, Harold Park and Gang Li
(Cross-listed and Co-organized with Minisymposium #91.)
91. Multiscale Modeling and Simulations of Nanocomposites
Organizers: Hanqing Jiang, Harold Park and Gang Li
(Cross-listed and Co-organized with Minisymposium #90.)
92. Modeling and Simulation of Multi-Phase and Multi-Material Flows
Organizers: Hyung Ahn, Raphael Loubere and Sam Schofield
94. Finite Elements for Large Strain Problems
Organizers: Manfred Bischoff and Ferdinando Auricchio
95. Computational Methods for Large Structures and Materials
Organizers: Robert Xiao
96. Models and Methods in Computational Vascular and Cardiovascular Mechanics
Organizers: Y. Bazilevs, V.M. Calo, C.A. Taylor and T.J.R. Hughes
97. Biofluids and Coupled Problems in Biomechanics
Organizers: Wolfgang Wall, Marek Behr and Alberto Figueroa

98. Computational Methods in Structural Health Monitoring and Mechanics of Active Material Systems
Organizers: Ajit Mal, Chengwen Liu and Ertugrul Taciroglu
99. Finite Element Methods in Environmental Fluid Mechanics
Organizers: Kazuo Kashiyama and Joannes Westerink

The following minisymposia are in honor of Prof. Kaspar J. Willam's 65th birthday

101. Computational Mechanics of Masonry Structures
Organizers: P. Benson Shing, Sashi Kunnath and Elio Sacco
102. Nonlocal and Generalized Continuum Modeling of Solids
Organizers: Stein Sture and Richard Regueiro
103. Computational Issues Related to Concrete and other Quasi-Brittle Materials
Organizers: Howard L. Schreyer, Daniela Ciancio and Ignacio Carol
104. Computational Techniques Related to Configurational Mechanics
Organizers: Paul Steinmann and Kenneth Runesson
105. Numerical Techniques for the Modeling of Failure in Solids
Organizers: Francisco Armero and Javier Oliver
106. Multiscale Modeling of Materials
Organizers: Ellen Kuhl and Ekkehard Ramm
107. Modeling and Solution Methods for Coupled Problem Simulation
Organizers: Carlos A. Felippa, K.C. Park and Wolfgang A. Wall

The following minisymposia are in honor of Prof. J. Tinsley Oden's 70th birthday

108. Large Scale and Distributed Computing: Application Development Towards Petascale Platforms
Organizers: S. J. Kim and A. K. Patra
109. Partition of Unity Finite Element and Meshless Methods: Advances and Engineering Applications
Organizers: C.A. Duarte, A. Simone, T. Strouboulis, J. Dolbow
111. Computational Solid Mechanics: Recent Advances
Organizers: J. N. Reddy, Jon Bass, and Jin-Rae Cho
112. Minisymposium on Adaptive Modeling in Computational Mechanics
Organizers: Kumar Vemaganti, Serge Prudhomme
113. Higher Order and hp Methods with Applications to Elliptic and Maxwell Problems
Organizers: Leszek Demkowicz,Philippe Devloo,Waldek Rachowicz
114. Multiple Scaling and Homogenization for Mechanics and Design Optimization
Organizers: N. Kikuchi, L. Trabucho de Campos, T. I. Zohdi
115. Contact, Impact and Crashworthiness
Organizers: Shen R. Wu, Jin-Rae Cho and Kingshuk Bose
116. Computational Biology, Biomechanics and Biomedicine
Organizers: Yusheng Feng, M. Nichole Rylander,Suvranu De
117. Recent Progress in A Posteriori Error Estimation
Organizers: M. Ainsworth and Theofanis Strouboulis
119. Computational Wave Propagation: Hierarchical modeling and adaptivity
Organizers:Frank Ihlenburg, Murthy Guddati, Dan Givoli
120. The k-Version of the Finite Element Method and h-p-k Adaptive Processes
Organizers: Albert Romkes, Karan S. Surana and J. N. Reddy

121. Funding Opportunities in Computational Mechanics
Organizers: Jacob Fish

Congress Program

Opening Remarks and Welcoming Address
Grand Ballroom, Monday, July 23, 8:00-8:15 am

Opening Remarks:

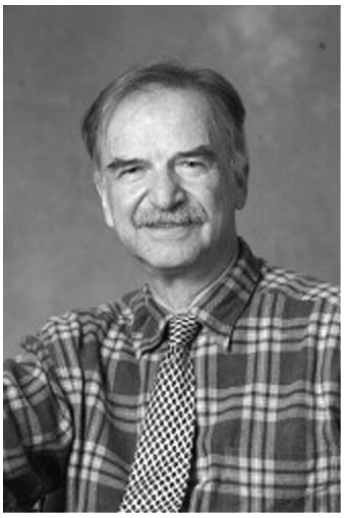
Professor Robert L. Taylor, Honorary Congress Chairman
Professor Gregory M. Hulbert, USACM President

Monday, July 23

Technical Session 1 – Morning Session
9:45 – 11:35 am

Technical Session 2 – Afternoon Session
2:10 – 4:00 pm

Technical Session 3 – Late Afternoon Session
4:30 – 6:20 pm



Kaspar Willam
University of Colorado at Boulder

Computational Failure Mechanics: Recent Advances and Open Issues

Monday, July 23rd, 8:15 - 9:15 a.m., Grand Ballroom

To start with, the question arises “how to interpret servo-controlled experimental observations in the post-peak response regime and how to extract objective material properties from novel image correlation systems?” On the theoretical side recent fracture energy-based softening models are contrasted in the context of continuum plasticity and cohesive interface formulations. The constitutive arguments of softening plasticity and damage lead to failure diagnostics which distinguish among continuous and discontinuous processes in the form of localization. This leads to the concomitant argument how to assure positive energy dissipation and the formulation of well-posed IBVP. Partial remedies are regularization techniques which involve nonlocal and/or multiscale aspects. For definiteness we examine the format of higher grade material in the form of `micromorphic' and `micropolar' continuum models which introduce a natural length scale at the material level.

Aside from the constitutive aspects the concomitant numerical issues need to deal with highly nonlinear and discontinuous degradation processes. To this end we revisit the elementary model problems of quasi-brittle materials in order to explain the difference of snap-back in direct tension and compression in cohesive-frictional materials. In tension snap-back develops during softening due to unloading of the elastic domain in a serial system, while compression mobilizes structural adaptation of the localized failure processes in the realm of parallel systems. A number of computational examples will help to illustrate these issues in 2D and 3D applications involving reinforced concrete and infill masonry structures, both are composites which exhibit large differences of stiffness, strength, and ductility/toughness.

The constitutive and computational questions culminate in open issues which came to the forefront during the recent NIST investigation of the collapse of the WTC Twin Towers. In this context the structural engineering community faced hard questions in addressing impact/fracture and subsequent thermal collapse. In fact, there is an increasing gap between the structural engineering community and the academic research focus on micro- and nano-investigation at atomistic and molecular levels. Current attempts to bridge this increasing gap are laudatory, showing modest promise.

Pierre Ladevèze
École Normale Supérieure de Cachan

Model Verification through Strict Upper Error Bounds

Monday, July 23rd, 1:00 – 2:00 p.m., Grand Ballroom A

Today, more than ever, modeling and simulation are central to any mechanical engineering activity. A constant concern both in industry and in research has been the verification of models, which can reach very high levels of complexity today. There are numerous sources of error: modeling, space and time discretization, iteration stopping. The novelty of today's situation is that over the last twenty-five years truly quantitative tools for assessing the quality of a FE model have appeared. Here, we will consider that in model verification, as the subject is now called. The original continuum mechanics model remains the reference. One of the key topics is the quality assessment of calculated outputs of interest obtained, for example, by finite element analysis. The objective goes beyond that of earlier error estimators, which provided only global information. This was totally insufficient for dimensioning purposes in mechanical design, where the dimensioning criteria involve local values of the stresses, displacements, stress intensity factors, etc. Since most of the available error estimators are nonconservative, the derivation of efficient and guaranteed upper error bounds for calculated outputs of interest is currently a challenge. The central questions discussed here are how to get efficient and guaranteed error bounds and how to calculate them. This presentation describes the current state-of-the-art, then introduces a general and recent answer both for linear problems and for time-dependent nonlinear problems, such as (visco)plasticity problems under quasi-static or dynamic conditions. Usual convexity properties are assumed through the standard thermodynamic framework with internal variables. This involves nonclassical concepts such as the "dissipation error" or the "Bmirror problem", which take the place of the adjoint problem. Nonintrusive error calculation methods are also introduced thanks to partition-of-unity techniques and other methods which have already been used for years.

Monday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
111 - Computational Solid Mechanics: Recent Advances					
Grand Ballroom B	Finite Eelement Formulation for Quasi and Full Incompressible Continua via Variational Finite Calculus	Finite Element Methods for Functionally Graded Materials	Thermo-Mechanical Modeling of Functionally Graded Shells	Alternative Rotation Parameterizations in Rod and Shell Theories	Implicit Dimensional Reduction via Standard Finite Element Analysis
	Carlos A. Felippa, Sergio Idelsohn, Eugenio Oñate	Carter Wellford, Richard Rhee	Roman Arciniega, J. N. Reddy	Maria Moreira, Paulo M. Pimenta	Kavous Jorabchi, Josh Danczyk, Krishnan Suresh
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	The Uncertainty Quantification Challenge: How do you demonstrate you know what you are doing?		Modeling Spatio-Temporal Random Field from Experimental Measurements	Uncertainty Propagation in Internal Acoustics through a Collocation Scheme	Fuzzy Uncertainty Assessment on the Identified Damage in a Cable-Stayed Bridge
	Dimitri Kusnezov		Sonjoy Das, Roger Ghanem, Steven Finette	Erb Ferreira Lins, Sergio Bellizzi, Fernando Rochinha	Daan Degrauwe, Guido De Roeck, Geert Lombaert
040 - Computational Mechanics in Geoscience Applications					
Boardroom C	Keynote: Discretizations and Solvers for Coupling Stokes and Darcy Flows with Transport		Streamline-Based Methods for Simulating Reactive Transport in Porous Media	Issues in Eulerian-Lagrangian Simulation of Complex Multiphase Flow and Transport	Adaptive Discontinuous Galerkin Method for Two-Phase Flow in Porous Media
	Ivan Yotov, Danail Vassilev		Andrew Tompson, Steven Carle, Dana Shumaker, Mavrik Zavarin	Thomas Russell	Shuyu Sun
084 - Parameter Identification and Experimental Validation					
Hospitality Room	A New Method for Acquiring True Stress-Strain Curves from Tensile Test	Dislocation Density Model for Plastic Behaviour of AISI 316L	Parameter Identification of Tidal Constituents Using Automatic Differentiation	Computation of Optimal Friction of Tuned Mass Damper for Controlling Base-Excited Structures.	
	ManSoo Joun, In-Su Choi, Jae-Gun Eom, Hong-Tae Kim, Mincheol Lee	Lars-Erik Lindgren	Chihiro Mizutani, Mutsuto Kawahara	Sang-Hyun Lee, Seung-Ho Cho, Lan Chung, Jae-Seung Hwang, Sung-Sik Woo, Eun-Jong Yu	
054 - Advances in Commercial Finite Element Software					
Plaza Room	Exploring New Horizons in the Solid-Shell Element Technology for General Nonlinear Applications	Improvements to Domain Decomposition and Parallel Processing in MSC.Marc	Application of Component Mode Synthesis in the Modeling of Flexible Bodies for Multibody Simulation	New Development of XFINAS Software for Nonlinear Dynamic and Seismic Analysis of Structures	
	Sanjay Choudhry, Rui P.R. Cardoso, M. Marhadika, J. W. Yoon	Alois Danek, Hassan Bayoumi	Hassan Bayoumi	Ki-Du Kim	
060 - Frontal Phenomena					
Bayview A	Frontal Propagation of Combustion Waves in Two-Phase-Flow Models of Porous Energetic Materials	Comparison Study of Dynamics in Both One-sided and Two-Sided Solid Combustion Models	Dynamics of Propagating Fronts: Flames, Aqueous Reactions, Free-Radical Polymerization and Bacteria	Multiscale Models of 3D Solid Tumor Growth	
	Stephen Margolis	Jun Yu, Laura K. Gross, Yi Yang	Paul Ronney, Ivy Chang, Steven Finkel, Alison Kraigsley	John Lowengrub, Yao-Li Chuang, Vittorio Cristini, Fang Jin, Xiangrong Li, Steven Wise	

Monday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
045 - Scalable Solution Algorithms for Computational Mechanics					
Bayview B	Scalable High-Order, High-Frequency Methods for Computational Acoustics and Electromagnetism	Rapid Frequency-Domain Computations Based on Multi-Point Pade-Reconstruction	A DD Method for a Class of Discontinuous Galerkin Discretizations of Helmholtz Problems	Computational Strategy for Structures with Repeated Patterns	Time-Parallel Solution of Nonlinear Structural Dynamics Problems
	Timothy Elling, Oscar Bruno	Saikat Dey	Radek Tezaur, Charbel Farhat, Jari Toivanen	Pierre Gosselet, Christian Rey, Daniel Rixen	Julien Cortial, Charbel Farhat
005 - Failure Mechanisms Under Dynamic Loading					
Seacliff A	An X-FEM Simulation Tool for Interpreting Dynamic Crack Propagation Experiments Under Mixed Loading	Impact and Dynamic Fragmentation with the Material Point Method	A Rate-Sensitive, Limit-State Material Model for Pressure-Sensitive Porous Materials	On Predicting Brittle Structural Fracture Owing to Impact	
	David Grégoire, Alain Combescure, Hubert Maigre	Biswajit Banerjee	Arlo Fossum, Rebecca Brannon	Kaushik A. Iyer	
109 - Partition of Unity Finite Element and Meshless Methods: Advances and Engineering Applications					
Seacliff B	Quadrature for Meshless Methods	Effect of Quadrature on the Generalized Finite Element Method	A treatment of Dirichlet boundary conditions in the Generalized Finite Element Method	Partition of Unity Method for Nonmatching Grids	Numerical Inf-Sup Test of the Method of Finite Spheres for the Solution of Plate Problems
	John Osborn, Ivo Babuska, Uday Banerjee	Uday Banerjee, Ivo Babuska, John Osborn	Victor Nistor, Ivo Babuska, Nicolae Tarfulea	Constantin Bacuta, Jinchao Xu, Ludmil Zikatanov	Suleiman Banihani. Suvranu De
024 - Computational Formulations Involving Shell and Other Thin-Walled Structures					
Seacliff C	A Computational Formulation for Thin Shell Problems with Arbitrary 3d-Material Models	Keynote: A Discrete Homogenization Technique for Graphene Sheets		Weight Reduction of Corrugated Board under Preservation of Buckling Strength	
	Werner Wagner, Friedrich Gruttmann, Sven Klinkel	Annie Raoult		Thomas Daxner, Thomas Flatscher, Franz G. Rammerstorfer	
022 - Computational Geometry and Analysis					
Seacliff D	Creation Of Accurate Surface and Volumetric Simulation Models via Fourier Analysis	Algebraic Splines for Analysis	T-Splines and Isogeometric Analysis: Fundamentals	T-splines and Isogeometric Analysis: Analysis	T-Splines and Isogeometric Analysis: Applications
	Oscar Bruno	Chandrajit Bajaj	Michael Scott, John Evans, Thomas Hughes, Scott Lipton	Scott Lipton, Yuri Bazilevs, Thomas Hughes, John Evans, Michael Scott	John Evans, Yuri Bazilevs, Victor M. Calo, Thomas J.R. Hughes, Scott Lipton, Michael Scott
092 - Modeling and Simulation of Multi-Phase and Multi-Material Flows					
Golden Gate Room	Material Order Independent Interface Reconstruction with Power Diagrams	A Pure Eulerian Scheme for Multimaterial Fluid Flows	Interface Reconstruction in Multi-Material Mixed Cells	Interface Reconstruction and Sub-Zone Physics Models	3D Interface Reconstruction for Multi-Mmaterial Flows on Generalized Polyhedral Meshes
	Sam Schofield, Rao Garimella, Marianne Francois, Raphael Loubere	Jean-Philippe Braeunig	Vadim Dyadechko	David Bailey, George Zimmerman	Hyung Taek Ahn, Mikhail Shashkov

Monday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
042/069 - Computational Methods for Solid-Solid Phase Transformations					
Marina Room	Modeling of Stress-Induced Martensitic Microstructures with Interfacial Energy Effects	Modelling the Interaction Between Austenite-Martensite Transformation and Plasticity in Steels	Discrete Model for Transformation-Induced Plasticity	A Computationally Efficient Statistical Approach for Modeling of Polycrystalline NiTi SMAs	Modeling of the Nonlinear and Hysteretic Constitutive Response of Magnetic Shape Memory Alloys
	Henryk Petryk, Stanislaw Stupkiewicz	Varvara Kouznetsova, Marc G.D. Geers	Sergio Turteltaub, Joris Remmers, Jingyi Shi, Erik Van der Giessen	Arkaprabha Sengupta, Panayiotis Papadopoulos	Bjoern Kiefer
014 - Stabilized, Multiscale and Multiphysics Methods					
Garden Room A	Keynote: Stabilized Mixed Continuous & Discontinuous Galerkin Methods for Convective –Diffusive Heat Transfer		A Fully Integrated Isogeometric Fluid-Structure Interation Analysis	Patient-Specific Modelling of Blood Flow and Drug Transport	The V-SGS+DRDJ Finite Element Approach for Steady and Unsteady Aerodynamics Computations
	Eugenio Oñate, Julio Garcia, Aleix Valls		Yuri Bazilevs, Victor M. Calo, Thomas J.R. Hughes, Yongjie Zhang	Nathan Brasher, Yuri Bazilevs, Victor M. Calo, Thomas J.R. Hughes	Andrea Santoriello, Alessandro Corsini, Filippo Menichini, Franco Rispoli, Tayfun Tezduyar
023 - Multidisciplinary Design Optimization - Theory, Methodology, and Application					
Garden Room B	Keynote: Concurrent Structure-Material Optimization Based On Uniform Material Microstructure		Structural Optimization Methods for Problems with many Variables and Constraints	Shaping of Grid Structures by Means of Algebraic Methods	Form-Finding Analysis of Cable Net Covered with Glass Panels
	Gengdong Cheng, Ling Liu, Jun Yan		Claude Fleury	Romuald Tarczewski, Waldemar Bober, Jan Florek	Qi-Lin Zhang, Xiao-Qun Luo
021 - Contact and Interface Mechanics: Developments and Applications					
Pacific Concourse A	Contact Problems with Friction in 3D: Scalable Algorithm Based on FETI Method	On an Augmented Lagrangian Method for Anisotropic Friction Models	Projected Schur Complement Method for Solving Non-Symmetric Systems and a Smooth FD Approach	Solvability of CPP Routines in Contact Analyses: Continuous Projection Domain for Arbitrary Surfaces	Variational Method to Solution of the Friction Contact Problem
	Radek Kucera, Zdenek Dostal	Karl Schweizerhof, Konyukhov Alexander	Tomas Kozubek, Jaroslav Haslinger, Radek Kucera	Alexander Konyukhov, Karl Schweizerhof	Kravchuk Alexander, Goryacheva Irina
087 - Mathematical Developments in Modern Topics in Composite Mechanics					
Pacific Concourse B	Interfacial Cracks Between a Piezoelectric Material and an Isotropic Material	Eshelby's Conjecture in Finite Plane Elastostatics	Weak Solutions for Boundary Integral Equations Associated with Thermoelastic Plates	Representation Formula Solutions for Thermoelastic Plates	
	Les Sudak	Peter Schiavone, Chun Il Kim	Igor Chudinovych, Christian Constanda	Christian Constanda, Igor Chudinovych	
121 - Funding Opportunities in Computational Mechanics					
Pacific Concourse C	Computational Solid Mechancis and Multi-Scale, Multi-Phenomena Problems	Future of Mechanics Research	Automotive Composites Consortium: Research Opportunities	Collaboration Opportunities with Sandia National Laboratories' Computer Science Research Institute	Research Directions in Computational Mechanics within Army Research Laboratory
	Ken P. Chong	Roshdy Barsoum	Mark Botkin	James R. Stewart, S. Scott Collis	Peter W. Chung
113 - Higher Order and hp Methods with Applications to Elliptic and Maxwell Problems					
Pacific Concourse D	Keynote: hp-Finite Elements with Local Exact Sequence Properties		Keynote: Simplicial Finite Element Families: Properties and Connections		Higher Order Accurate Discretization of Compressible MHD
	Joachim Schoeberl, Sabine Zaglmayr		Richard Falk, Douglas Arnold, Ragnar Winther		Timothy Barth

Monday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
103 - Computational Issues Related to Concrete and other Quasi-Brittle Materials					
Pacific Concourse E	Modeling of Interfaces in Concrete Materials and Structures	Predicting Surface Orientation and Stress at Failure of Concrete and Geological Materials	Modeling Sea Ice with the Material-Point Method	Computational Analysis of Concrete Time Dependent Failure Prosseses at Mesostructural Level	Simulation of Fresh Concrete Flow
	John Bolander, Daisuke Asahina	Howard L. Schreyer	Deborah Sulsky, Giang Nguyen, Kara Peterson, Howard L. Schreyer	Ricardo Lorefice, Guillermo Etse	Borek Patzak, Zdenek Bittnar
050 - Meshfree and Generalized/Extended Finite Element Methods					
Pacific Concourse F	Keynote: Accurate Analysis of Three-Dimensional Fracture Mechanics Problems Using Coarse Meshes		RKEM Implementation for Strain Gradient Theory in Multiple Dimensions	Reproducing Kernel Enhanced Local Radial Basis Collocation Method	Error Analysis of Trefftz Methods for Laplace's Equation with Singularity Problems
	A. Duarte, Dae-Jin Kim, Jeronymo Pereira		Abhishek Kumar, D. C. Simkins	W. Hu, J. S. Chen, H. Y. Hu	Zi Cai Li
016 - Advances and Applications of Meshfree and Extended Finite Element Methods					
Pacific Concourse G	Keynote: Application of EFG in LS-DYNA to Microscopic Simulation of Rubber Compounds under Periodic Boundary		A Generalized Grid-based Adaptive Mesh-Free Method for High Velocity Impact Problems	NURBS Geometry, Parametric Reproducing Kernel and Engineering Computations	
	Masataka Koishi, Dennis Lam, Hiroki Shimamoto, Gregg Skinner, C. T. Wu		Hongsheng Lu, C. T. Wu	D Roy, Biswanath Banerjee, Amit Shaw	
034 - Turbulence Simulation: Methods and Applications					
Pacific Concourse H	Keynote: Large Eddy Simulation Modeling and Multi-point Velocity Correlations		An Algorithm, and Theory for Error Analysis of Turbulent Flow Simulations	Scaling Properties of Subgrid-Scale Energy Dissipation and Scalar Dissipation in LES	Implementation of the SA-DES Turbulence Model in a Hybrid Incompressible Flow Solver
	Robert Moser, Amitabh Bhattacharya, Henry Chang		Krishnan Mahesh	Sergei Chumakov	Shuangzhang Tu, Shahrouz Aliabadi
015/041 - Advances in Multiphysics Behavior, Fracture, and Plasticity Analyses at the Nanoscale					
Pacific Concourse I	Temperature and Strain-Rate Dependence of Surface Dislocation Nucleation in Small-Volume Materials	Free-end Nudged Elastic Band Method To Study Thermally Activated Nanomechanical Processes	Prediction of Atomic Scale Instabilities	Extension of Molecular Statics for Crystals to Non-zero Temperatures	
	Ting Zhu, Ken Gall, Austin Leach, Ju Li, Amit Samanta	Peter Gordon, Ju Li, Amit Samanta, Ting Zhu	Terry Delph, Jeffery Rickman, Jon Zimmerman	Oleg Vinogradov	
029 - Computational Methods in Bioengineering					
Pacific Concourse J	Keynote: Measuring and modeling the elasticity of the human cornea		Pointwise Identification of Elastic Parameters for Heterogeneous Nonlinear Hyperelastic Membranes	Finite Element Modeling of the Human Knee: A Study of Hyperelastic Parameters of Knee Soft Constrain	Brain Injury Analysis using the VOXEL Head Model
	Peter Pinsky		Jia Lu, Xuefeng Zhao	Qunli Sun, Yasin Dhaher, Brian Moran, Huang Tang	Dai Watanabe, Shigeyuki Murakami, Tetsuya Nishimoto, Hiroyuki Takao, Kohei Yuge

Monday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
020 - Computational Methods in Impact Engineering					
Pacific Concourse K	Keynote: Evolving Technology: Multi-Phase, Multi-Material, ALE Approach for Buried Mine Blast Simulation		Computational Studies of Polyurea Coated Steel Plate Under Blast Loads	Blast and Ballistic Impact on Polymer Reinforced Plates and Shells	Propagation of Thermoelastic Waves in the Plate Under Contact with the Intender
	Rahul Gupta		Chien-Chung Chen, Emre Alpman, Daniel Linzell, Lyle Long	Tamer Elsayed, Fernando Fraternali, Alejandro Mota, Michael Ortiz	Alexey Loktev, Irina Lokteva
003 - Discontinuous Galerkin methods for PDEs					
Pacific Concourse L	Superconvergence of the Discontinuous Galerkin for Hyperbolic Problems on Triangular Meshes	Error Estimation and Superconvergence for Discontinuous Galerkin Methods	An Hp-Adaptive Spacetime Discontinuous Galerkin Method for Hyperbolic Problems	Preconditioning of Interior Penalty Discontinuous Galerkin FEM for Elliptic Problems	
	Mahboub Baccouch, Slimane Adjerid	Slimane Adjerid, Mahboub Baccouch, Denis Issaev, Thomas Weinhart	Scott Miller, Robert Haber	Raytcho Lazarov	
107 - Modeling and Solution Methods for Coupled Problem Simulation					
Pacific Concourse M	Keynote: A Stabilized Explicit Coupling Scheme for Fluid-Structure Interaction Based on Nitsche's Method		Stability And Accuracy of Mortar and LLM Methods for Partitioned Analysis of Coupled Systems	Fluid-Structure Partitioned Procedures Based on Robin Transmission Conditions	Advances in Algebraic Multigrid in Fluid Structure Interaction Simulations
	Miguel Angel Fernandez, Erik Burman		Carlos A. Felippa, K.-C. Park, Michael R Ross	Santiago Badia, Fabio Nobile, Christian Vergara	Michael Gee, Ulrich Kuettler, Wolfgang A. Wall
059 - Shape and Topology Optimization in Computational Mechanics					
Pacific Concourse N	Topology Optimization - Improved Checker-Board Filtering with Sharp Contours	Optimization of Continuous Heterogenous Material Fields	Shape Sensitivity Design and Optimization for Design-Dependent Loadings (Response Spectrum Analysis)	Saint Venant's Principle Applied to Topology Optimization	
	Lars Damkilde, Anders S. Kristensen	Vadim Shapiro, Jiaqin Chen	Jalal Akbari, Nam Ho-Kim	Anca-Maria Toader	
062 - Advances in Multi-Modelling, Transmissions and Associated Numerical Methodologies					
Pacific Concourse O	Computational Bridges in the Multiscale Modeling of Macromolecular Materials	A Continuum/Atomistic Partition in the Arlequin Framework	FETI-2LM Method with Non Conforming Grids	Computational Strategy Based on Nonlinear Patches with Mixed Transfer Conditions	A Computational Strategy for Coupled Problems with a Time and Space Interface Between Physics
	Francisco Chinesta, Amine Ammar, Elias Cueto, Pierre Guillormini	Hachmi Ben Dhia, Nadia Elkhodja	François-Xavier Roux	Christian Rey, Pierre Gosselet, Julien Pebrel	David Néron, David Dureisseix

Monday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
111 - Computational Solid Mechanics: Recent Advances					
Grand Ballroom B	On Bubble Stabilization of the Baumann-Oden DG Method.	Experimentally-based Viscoelastic Constitutive Model for Simulation of Impact Response of Polyurea	Nonlinear Viscoelastic Constitutive Law for Unvulcanized Carbon Black Filled Rubbers	Low Order Bi-Linear Finite Elements for Tetrahedrals Using Volume and Area Bubble Functions	Numerical Solution of the Singular Integral Equations of the Second Kind and its application
	Franco Brezzi, L. Donatella Marini	Sia Nemat-Nasser, Alireza Amirkhizi	Mahmoud Assaad	Rolf Mahnken, Ismail Caylak	Xiaoqing Jin, Leon Keer, Qian Wang
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	Model Validation as a Problem in Approximation Theory	A Stochastic Lagrangian Approach for Uncertainty Quantification in Electrostatically Actuated MEMS	Validation of Software for 3D Propagation of Waves in Heterogeneous and Random Media	Efficient Numerical Methods for Stochastic Computations	Advanced Computational Method for Reliability Analysis of Concrete-Faced Rockfill Dam
	Roger Ghanem, John Red-Horse	Nitin Agarwal, Narayana Aluru	Regis Cottereau, Didier Clouteau, Raul Madariaga, Jean-Pierre Vilotte	Dongbin Xiu	Qingxi Wu, Kuizhi Zhao
040 - Computational Mechanics in Geoscience Applications					
Boardroom C	Adaptive Algorithms for Subsurface Flow	Multiscale Mortar Mixed Finite Element Methods for Nonlinear Problems	The Representer Method for Parameter and State Estimation in Reservoir Modeling	Deterministic Sensitivity Analysis for a Model for Transport in Porous Media	A New Mixed Finite Element on Hexahedra that Reduces to a Cell-Centered Finite Difference Method
	John Bell	Eun-Jae Park, Mary Wheeler	Marco A. Iglesias, Clint Dawson	Estelle Marchand, Francois Clement, Guillaume Pepin, Jean Roberts	Sebastien Matringe, Ruben Juanes, Hamdi Tchelepi
084 - Parameter Identification and Experimental Validation					
Hospitality Room	Identification of Viscoelastic Relaxation Spectra with Error Control	Numerical Simulation and Experimental Validation of the Microindentantion Test	Finite Element Model Updating of 1/5-scale Reinforced Concrete Wall Building Specimens		
	Hakan Johansson, Fredrik Larsson, Kenneth Runesson	Diego Celentano, Marcela Cruchaga, Manuel Francois, Bruno Gueloget	Eun-Jong Yu, Seung-Ho Cho, Lan Chung, Hack-Jin Kim, Sang-Hyun Lee, Sung-Sik Woo		
054 - Advances in Commercial Finite Element Software					
Plaza Room	The Development of Design Support Method Considering Trade-Off EInteraction and Application to the Tir	New Development in Composite Failure Analysis	On-Demand Numerical Code Generation and Finite Element Analysis	Research on the Manufacturing Technology of Alternator Housing	
	Takeshi Hirose	Per Nordlund, Adrie Bout, Sanjay Choudhry	Joze Korelc	Kyu-Taek Han	
060 - Frontal Phenomena					
Bayview A	Pulse Interaction and Vortices in Excitable Reaction-Diffusion Systems	Frontal Polymerization in a Medium with Periodic Monomer Distribution	Noise Induced Solidification in Pure Material	Locally Conservative Fluxes for the Continuous Galerkin Method	
	Oliver Steinbock	Laura K. Gross, Dmitry Golovaty, James T. Joyner	Chin Yi Chee	Haiying Wang	

Monday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
045 - Scalable Solution Algorithms for Computational Mechanics					
Bayview B	Parallel Algebraic Multigrid for the Incompressible Navier-Stokes Equations.	An Implicitly Coupled Parallel Fluid-Structure Interaction Algorithm for Blood Flow in Arteries	Lagrange-Newton-Krylov-Schwarz Algorithms for Stability Control of Unsteady Incompressible Flows	Parallel Mesh Generation for CFD Simulations of Complex Real-World Aerodynamic Problems	A Parallel-Adaptive SDG Method for Wave Propagation Problems Using ParFUM
	Chun Sun, Jacob Fish, Kenneth E. Jansen, Haim Waisman	Andrew Barker, Xiao-Chuan Cai	Ernesto Prudencio, Xiao-Chuan Cai	George Zagaris, Andrey Chernikov, Nikos Chrisochoides, Shahyar Pirzadeh	Aaron Becker, Laxmikant Kale, Robert Haber
005 - Session 1: Failure Mechanisms Under Dynamic Loading					
Seacliff A	On XCT and Computational Damage-based Modeling - A Growing Partnership	Failure Analysis and Optimization of As--Built Parts Using Reverse Engineering and FEA Analysis	Blast Resistance of Unidirectional Fiber Reinforced Composites	The Effect of Grain Boundary Strength, Toughness, and Flaws on the Spall Strength of Silicon Carbide	
	Joe Wells	Pierre Boulanger, Manuel Garcia, Saul Rodriguez	Noha Hassan, R. Batra	Tracy Vogler, James Foulk III, George Mseis	
109 - Partition of Unity Finite Element and Meshless Methods: Advances and Engineering Applications					
Seacliff B	Keynote: Orbital HP-Clouds for Solving Schrödinger Equation in Quantum Mechanics		The Elasto-Plastic Analysis with the Natural Neighbour Radial Point Interpolation Method	Meshless Simulation of Navier-Stokes Eqns. with High-Order and Spatially Adaptive Basis Functions	Non-radially Symmetric Radial Basis Functions
	J. S. Chen, W. Hu, M. Puso		Renato Natal Jorge, Jorge Belinha, Lucia Dinis	L. A. Barba, L. F. Rossi	Donald Myers
024 - Computational Formulations Involving Shell and Other Thin-Walled Structures					
Seacliff C	Three-Dimensional Solid Finite Elements for Thick and Thin Shell Analysis	Dynamics of Nonlinear Shells and an Exact Conserving Algorihtm	"Upgrading" Membranes to Shells - The CEG Rotation Free Shell Element and its Applications	On the Asymptotic Behavior of Shells of Revolution in Free Vibration	Development of Incompressible Hyper-elastic Shell Element with Application to Ogden-type Materials
	Manfred Bischoff	Paulo M. Pimenta, Eduardo M. B. Campello, Peter Wriggers	Johannes Linhard, Kai-Uwe Bletzinger, Matthias Firl	Edoardo Artioli, Lourenco Beirao da Veiga, Harri Hakula, Carlo Lovadina	Masato Tanaka, H. Noguchi
022 - Computational Geometry and Analysis					
Seacliff D	Discrete Approximations in Structural Dynamics and Wave Propagation: p-FEM vs. k-NURBS - Part I	Discrete Approximations in Structural Dynamics and Wave Propagation: p-FEM vs. k-NURBS - Part II	A Fully-Locking Free Isogeometric Approach to Linear Elasticity	B/F-Bar Projection Methods for Nearly Incompressible Analysis Using High Order NURBS	Approximation of the Cahn-Hilliard Phase Field Model by Using Isogeometric Analysis
	Giancarlo Sangalli, Thomas Hughes, Alessandro Reali	Alessandro Reali, Thomas Hughes, Giancarlo Sangalli	Lourenco Beirao da Veiga, Ferdinando Auricchio, Annalisa Buffa, Carlo Lovadina, Alessandro Reali, Giancarlo Sangalli	Thomas Elguedj, Yuri Bazilevs, Victor M. Calo, Thomas J.R. Hughes	Hector Gomez, Yuri Bazilevs, Victor M. Calo, Thomas J.R. Hughes
092 - Modeling and Simulation of Multi-Phase and Multi-Material Flows					
Golden Gate Room	Keynote: Computational Techniques for Stabilized Edge-Based Finite Element Simulation of Free-Surface Flows		Multimaterial Arbitrary Lagrangian-Eulerian Method for Compressible Fluid Dynamics	Interface Reconstruction in 2D and 3D Arbitrary Lagrangian-Eulerian Adaptive Mesh Refinement Simulat	
	Alvaro Coutinho, Renato Elias, Marcos Martins		Milan Kucharik, Richard Liska, Mikhail Shashkov	Nathan Masters, Robert Anderson, Noah Elliott, Aaron Fisher, Brian Gunney, Alice Koniges	

Monday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
042/069 - Computational Methods for Solid-Solid Phase Transformations					
Marina Room	Cyclic Martensitic Phase Transformations of Monocrystals at Finite Strains	A New Phase-Field Approach for the Modeling of Martensitic Phase Transitions at Nanoscale	A Two-Surface Constitutive Model for Austenite-Martensite Phase Transformation in SMAs	Simulation of SME-Materials Behavior during Phase Transformation Based on Quasi-Stochastic Approach	Solid-Solid Phase Transition of p-terphenyl Under Extreme Temperature and Pressure
	Erwin Stein, Gautam Sagar	Alexander Idesman	Alex Kelly	Lyudmila Vyunenko	Eric Chronister, Bohdan Schatschneider
014 - Stabilized, Multiscale and Multiphysics Methods					
Garden Room A	Progress on Iterative Matrix Solvers for Incompressible and Low-Speed Compressible Flows 1	SPIKE: A Parallel Hybrid Sparse System Solver	The Variational Multiscale-Multigrid Method (VM3): Merging Method and Solver	A Q1/P0 Variational Multi-Scale Approach to Lagrangian Shock Hydrodynamics	Collapse of a Liquid Column Over an Obstacle: Numerical Simulation and Experimental Validation
	David Gartling, Clark Dohrmann	Ahmed Sameh	Volker Gravemeier, Michael Gee, Wolfgang A. Wall	Guglielmo Scovazzi, Edward Love, Mikhail Shashkov	Marcela Cruchaga, Diego Celentano, Ivodinko Prado, Tayfun Tezduyar
023 - Multidisciplinary Design Optimization - Theory, Methodology, and Application					
Garden Room B	Schemes for Computational Savings in Topology Optimization	Topology Optimization of Shell Structures for Crashworthiness using the Explicit Method	A Fully-Stressed Design, Geometry Projection Method for Topology Optimization with Fatigue	Multiple Phase Optimization of Composite Structures	
	James K. Guest	Kohei Yuge, Kaoru Kobayashi, Yohei Tsuganezawa	Julian Norato	Ming Zhou, Raphael Fleury, Tim Willment	
021 - Contact and Interface Mechanics: Developments and Applications					
Pacific Concourse A	Verification Problems for Quasistatic Frictional Contact Between Deformable Bodies	The Effect of Third Bodies in the Contact Interface on the Macroscopic Coefficient of Friction	A Finite Element Based Elastic-Plastic Asperity Interactions Model of Solid Surfaces in Contact	Computational Modeling of Surface Phenomena in Stimulus-Responsive Hydrogels	Contact algorithms for multi-mechanics simulation
	Michael Starr, Kendall Pierson, Dan Segalman, Benjamin Spencer	Ilker Temizer, Peter Wriggers	Jamil Abdo	Ilinca Stanciulescu, J. Dolbow, Stefan Zauscher	Jerome Solberg
087 - Mathematical Developments in Modern Topics in Composite Mechanics					
Pacific Concourse B	Boundary Element Analysis of Stress Distribution Around a Crack in Plane Micropolar Elasticity	Transient Heat Conduction in Porous and Particulate Composite Materials	Exact Analysis of Electro-Thermo-Mechanical Responses in Composites and FGM	A Semi-Analytical Solution for Multiple Interacting Circular Nano-Inhomogeneities with Surface/Inter	
	Stanislav Potapenko, Elena Shmoylova	Elizaveta Gordeliy, Steven L. Crouch, Sofia G. Mogilevskaya	Jiann-Quo Tarn, Hsi-Hung Chang	Sofia G. Mogilevskaya, Steven L. Crouch, Henryk Stolarski	
012 - Computational Acoustics and Computational Ultrasonics					
Pacific Concourse C	Vibroacoustic Toolkit for Computational Biology and Biomedical Modeling	Homogenization of Two-Dimensional Clusters of Cylinders Embedded in Fluid and Gases	Application of Computer Modeling for Determination of Acoustical Parameters		
	Petr Krysl, Ted Cranford, John Hildebrand	Jose Sanchez-Dehesa, Daniel Torrent	Farkhad Akhmedzhanov		

Monday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
113 - Higher Order and hp Methods with Applications to Elliptic and Maxwell Problems					
Pacific Concourse D	Polynomial Extension Operators in H(curl)	Fast Solvers for HP-FEM Using Hexahedral Elements	On the Discrete Compactness of HP Finite Elements	Higher Order Finite Elements on Pyramids	
	Jay Gopalakrishnan, Leszek Demkowicz, Joachim Schöberl	Sven Beuchler	Daniele Boffi	Joel Phillips	
103 - Computational Issues Related to Concrete and other Quasi-Brittle Materials					
Pacific Concourse E	3D Stress Recovery Method at Mesh Nodes and its Application to Discrete Fracture Models	Formulation for Chemical Energy Conservation for FEM Calculation	A Multiscale Chemo-mechanical Model for Stiffness Degradation of Concrete under Fire	Modelling Concrete Degradation in Dams Due to Alkali-Aggregate Reaction	Meshless IRBFN-Based Numerical Simulation of Dynamic Strain Localization in Quasi-Brittle Materials
	Daniela Ciancio, Ignacio Carol	Tadaaki Tanabe, Yasuaki Ishikawa	Yunping Xi, Jaesung Lee, Kaspar Willam	Claudia Comi, Roberto Fedele, Umberto Perego	Thanh Tran-Cong, Graham Baker, Phong Le, Nam Mai-Duy
050 - Meshfree and Generalized/Extended Finite Element Methods					
Pacific Concourse F	Keynote: A Galerkin Meshfree Particle Method and Implementation of Max-Ent Shape Functions		MLS (Moving Least Square) Variable-Node Elements and their Applications	Discrete Gradient Galerkin Method	
	M. Puso, J. S. Chen, N. Sukumar, Edward Zywicz		Seyoung Im, Jun Ho Lee, Jae Hyuk Lim, Dongwoo Sohn	Jing Qian, Jia Lu	
016 - Advances and Applications of Meshfree and Extended Finite Element Methods					
Pacific Concourse G	X-FEM Analysis of Delamination Fatigue Cracks in CFRP Composite Laminates	An Elasto-Plastic Crack Analysis Using X-FEM Under Thermal Cycling Loading	Crack Analysis in Shell Structures with XFEM	Computational Aspects of Fracture Simulation Using XFEM and Meshfree Method in the LS-DYNA Code	A Study of Crack Propagation Using a Cohesive-Zone Approach in XFEM and the Interface Element Method
	Toshio Nagashima, Hiroshi Suemasu	Shogo Nakasumi, Akira Tezuka	Yong Guo, C. T. Wu, Pablo Zavattieri	C. T. Wu, Yong Guo, Hongsheng Lu, Jingxiao Xu	Pablo Zavattieri, Yong Guo, C. T. Wu
034 - Turbulence Simulation: Methods and Applications					
Pacific Concourse H	On the Dissipative Structure of Stabilized and LES Models for Incompressible Flows	Developments in the Variational Multiscale Formulation of Large Eddy Simulation	Variational Multiscale Residual-Based Models for Large-Eddy Simulation of Turbulence	Role of Continuity in Residual-Based Multiscale Modeling of Turbulence	
	Ramon Codina, Oriol Guasch	Assad Oberai, John Wanderer, Zhen Wang	Victor M. Calo, Yuri Bazilevs, Thomas J.R. Hughes	Ido Akkerman	
015/041 - Advances in Multiphysics Behavior, Fracture, and Plasticity Analyses at the Nanoscale					
Pacific Concourse I	Atomistic Simulations of Elastic and Inelastic Grain Boundary Evolution during Tensile Deformation	To Twin or Not to Twin: Reconciliation of Simulation and Experiment in FCC Metals	Mechanisms for the pseudoelasticity of metal nanowires	Deformation and Stability of Metal Nanowires	
	Douglas Spearot	Derek Warner, William Curtin	Min Zhou, Xiang Guo	Austin Leach, Ken Gall, Matt McDowell	

Monday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
029 - Computational Methods in Bioengineering					
Pacific Concourse J	Computer Aided Tissue Engineering and Application in Multi-Level Modeling of Tissue Constructs	Continuum Mechanics Based Multi-Scale Tumor Modeling Using PET/CT Imaging	Finite Element Modeling of Microscale Biphasic Mechanics in Articular Cartilage under Cyclic Loading	Multiscale Finite Element Analysis of Tissue Mechanics	Comparison of Some MOR Methods for Surgical Simulation Using the PCMFS
	Karen C. Yan, Sun Wei, Kalyani Nair	Krishnan Suresh, Robert Jeraj, Kavous Jorabchi, Benjamin Titz	Eunjung Kim, Farshid Guilak, Mansoor Haider	XJ luo, Victor Barocas, Mike Evans, Edward Sande, Mark Shephard, Triamtafyllos Stylianopoulos	Suvranu De, Suleiman Banihani
020 - Computational Methods in Impact Engineering					
Pacific Concourse K	Material Influences on Dynamic Neck Retardation	Numerical Analysis of the Plate Impact Test Using a Multiscale Damage Modelling	Advances in Computational Mechanics for Defense and Security Applications	Contact Explosive Forming Process Simulation of Al2024 Sheet	Analysis of Structural Optimization Based on Radial Basis Function Neural Network
	Zhenyu Xue, John Hutchinson, Ashkan Vaziri	Christophe Czarnota, Nicolas Jacques, Sébastien Mercier, Alain Molinari	Murl Culp, Bruce Schmacker	Seyed AliAsghar Akbari Mousavi, Mohammad Riahi	Li Huijin, He Changjun
003 - Discontinuous Galerkin Methods for PDEs					
Pacific Concourse L	Discontinuous Galerkin Methods for Problems in Finite Strain Gradient Plasticity	A C^0 Discontinuous Galerkin Approach for the Geometrically Nonlinear Analysis of Thin Shells	Adaptive Stabilization for Discontinuous Galerkin in Nonlinear Elasticity	A Discontinuous Galerkin Method for Linear Strain-Gradient Theory of Elasticity in Three Dimensions	A New Discontinuous Galerkin Formulation of Kirchhoff-Love Shells
	Andrew McBride, Daya Reddy	Nguyen Tien Dung, Garth N. Wells	Alexander TenEyck, Fatih Celiker, Adrian Lew	Ram Bala Chandran, Ludovic Noels, Raul Radovitzky	Ludovic Noels, Raul Radovitzky
107 - Modeling and Solution Methods for Coupled Problem Simulation					
Pacific Concourse M	Domain Decomposition Based Newton Algorithm for Fluid-Structure Interaction Problems	Finite Element Immersed Boundary Method: Application to the Simulation of the Cochlea	Numerical Modeling of Solitary Waves Over a Movable Bed		
	Marina Vidrascu, Miguel Angel Fernandez, Jean Frederic Gerbeau, Antoine Gloria	Lucia Gastaldi, Daniele Boffi, Luca Heltai	Heng Xiao, Yin Lu Young		
059 - Shape and Topology Optimization in Computational Mechanics					
Pacific Concourse N	A Logical Criterion for Creation of a New Hole Comparing Boundary and Interior Point Sensitivities	Shape Optimization Using Formulation Based on Efficient Bubble Element for Compressible Flows	Parametric Surface Definition for Shape Optimization Using Automatic Differentiation	Design of Functionally Graded Structures using Projection Functions in Topology Optimization	
	Byung Man Kwak, Soobum Lee	Shuji Nakajima, Mutsuto Kawahara	Yuya Takahashi, Mutsuto Kawahara	Sylvia Almeida, Glaucio Paulino, Emilio Silva	
Pacific Concourse O					

Monday – Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
111 - Computational Solid Mechanics: Recent Advances					
Grand Ballroom B	Metamodel Assisted Probabilistic-Based Design Optimization	Given's Rotation – Direct Evaluation Algorithms	Natural Element Approximation of Kirchhoff and Reissner-Mindlin Plates	Computational Tire Modeling	Modelling of PLC-Effects in the Al6061/Al2O3 Alloy
	Manolis Papadrakakis, Nikos Lagaros	Tirupathi Chandrupatla	Jin-Rae Cho, Hong-Woo Lee	Barry Yavari, Tim Davis, Mike Poldneff	Galina Lasko, Yevgenii Deryugin, Siegfried Schmauder
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	Fast Generation of Coarse-Scale Subsurface Flow Models for Uncertainty Quantification	Robust Updating from Experimental Measurements in Computational Dynamics.	A Sparse Grid Collocation Scheme for Stochastic Inverse Problems	Bayesian Methods for Estimating the Reliability in Hierarchical Systems	Non-Gaussian Functions and Linear Random Vibration Problems
	Louis Durlofsky, Yuguang Chen	Evangeline Capiez-Lernout, Christian Soize	Nicholas Zabaras, Sethuraman Sankaran	Philippe Pebay, Paul Boggs, Youssef Marzouk, John Red-Horse	Mircea Grigoriu
040 - Computational Mechanics in Geoscience Applications					
Boardroom C	IPEGG - a Project on the Coupling of Fluid Flow and Geomechanics	Unsteady Waves Simulations in a Global Ocean Model	Conservation in Three-dimensional Finite Element Free-Surface Ocean Model on Moving Prismatic Meshes	Finite-Element Tridimensional Modeling of the Circulation in the Mururoa Atoll Lagoon.	
	Sabine Muntz, Doug Angus, Martin Dutko, Quentin Fisher, Michael Kendall	Richard Comblen, Eric Deleersnijder, Vincent Legat	Vincent Legat, Eric Deleersnijder, Laurent White	Sébastien Blaise, Eric Deleersnijder, Jean-Francois Remacle, Laurent White	
098 - Computational Methods in Structural Health Monitoring and Mechanics of Active Material Systems					
Hospitality Room	Surrogate-Model Accelerated Random Search (SMARS) Algorithm for Global Optimization	Sensitivity-Based Finite Element Model Updating in OpenSees	Shape Optimization of Electromechanical Domains Using Meshfree Methods and Implicit Boundary Curves		
	Wilkins Aquino, John Brigham	Michael Scott	Chengwen Liu, Ertugrul Taciroglu		
090/91 - Modeling and Simulations of Multifunctional Nanomaterials and Multiscale Modeling and Simulations of Nanocomposites					
Plaza Room	Modeling and Characterization of Nanocomposites by the Boundary Element Mehtod	Multiscale Constitutive Modeling of Polymer Materials	Multiscale Calculation of Phonon Density of States for Nanocomposite Structures	A Piezoelectric 3D-Beam Finite Element Formulation Considering Geometrical and Material Nonlinearity	Computational Modeling of Nanocomposites
	Xiaolin Chen, Yijun Liu	Gregory Odegard, Pavan Valavala	Gang Li	Sven Klinkel, Alexander Butz, Werner Wagner	Thomas Clancy
066 - Modeling and Simulation of Nano Materials and Mechanics					
Bayview A	Energetics of {105}-Faceted Ge Nanowires on Si(001): An Atomistic Calculation of Edge Contributions	Tension–Compression Asymmetry and Size Effects in Nanocrystalline Ni Nanowires	Atomistic Simulation of Thermal and Phonon Transport in Nanoscale Materials	Molecular Dynamics Study of Nano-Twin Structures: Twin Formation and Boundary Migration	
	Chris Retford, Mark Asta, Michael Miksis, Peter Voorhees, Edmund Webb III	Diana Farkas, Joshua Monk	Patrick Schelling, Sylvie Aubry, Chris Kimmer, Ashton Skye	Qiyang Hu, Anothony Brown, Nasr M. Ghoniem, Lan Li	
045 - Scalable Solution Algorithms for Computational Mechanics					
Bayview B	Optimal TOTAL FETI Solver for 3D Frictionless Contact Problems	Some Recent Developments in Parallel Domain Decomposition-based Nonlinear Preconditioning Methods	Dynamic Monitoring for Load Balancing in Cluster Environments		
	Vit Vondrak, Zdenek Dostal, David Horak	Feng-Nan Hwang, Xiao-Chuan Cai	James Teresco		

Monday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
079 - Simulation of Non-Gaussian Random Fields: Theory and Applications					
Seacliff A	Higher-Order Stochastic Simulation of Multiphase Random Fields	Multi Level Probabilistic Characterization and Monte Carlo Simulation of Irregular Masonry Walls	Translation-Based Models for the Simulation of Non-Gaussian Random Fields: Theory and Applications		
	Lori Graham-Brady, X. Frank Xu	Seymour Spence, Massimiliano Gioffrè, Mircea Grigoriu	George Stefanou, Manolis Papadrakakis		
109 - Partition of Unity Finite Element and Meshless Methods: Advances and Engineering Applications					
Seacliff B	Keynote: Meshfree and PU Multiscale Methods for Failure: on Circumventing Loss of Ellipticity, Dislocations and other Issues		Mesoscale Simulation of Heterogeneous Propellant Combustion by Generalized Finite Element Method	Analysis of Three-Dimensional Heat Transfer Problems Involving Sharp Thermal Gradients	Extended Finite Elements on Polygonal Meshes
	Ted Belytschko, Robert Gracie, Stefan Loehnert, Jay Oswald, Jeong-Hoon Song		Karthik Srinivasan, Philippe Geubelle, Thomas Jackson, Karel Matous	Patrick O'Hara, A. Duarte	Alireza Tabarraei, Mukul Kumar, James Stolken, N. Sukumar
024 - Computational Formulations Involving Shell and Other Thin-Walled Structures					
Seacliff C	Adaption of the Assumed Natural Strain Method for Application in a Surface-Related Shell Formulation	A Simple Triangular Finite Element for the Nonlinear Analysis of Thin Shells	Bilinear Shell Elements and Edge Effects	Finite Element Modeling of Middle Ear Structural Acoustics	Studies of Refinement and Continuity in Isogeometric Analysis of Thin Walled Structures
	Bernd W. Zastrau, Rainer Schlebusch	Edgard S. Almeida Neto, Eduardo M. B. Campello, Paulo M. Pimenta	Antti H. Niemi	James Tuck-Lee, Peter Pinsky, Sunil Puria, Charles Steele	J. Austin Cottrell, Thomas J.R. Hughes
022 - Computational Geometry and Analysis					
Seacliff D	Free-Form FInite Elements: Computational Geometry and Element Formulation	A Formal Procedure for Distributed Design of Engineering Systems without CAD Exchange	Shape Design Optimization of Geometrically Nonlinear Structures using Isogeometric Analysis	Shape Sensitivity of Constructive Representations	
	Mark Rashid, Tarig Dinar, Mili Selimotic	Venkatakrishnan Srinivasan, Ganesh Subbarayan, Satish Radhakrishnan	Seonho Cho, Seung-Hyun Ha	Jiaqin Chen, Michael Freytag, Vadim Shapiro	
092 - Modeling and Simulation of Multi-Phase and Multi-Material Flows					
Golden Gate Room	A Higher-Order Generalized GFM for Two-Phase Flow Computation of Underwater Explosion and Implosion	A Comparison of Level Set Implementations for Mold Filling Simulations	Numerical Simulation of Bubble Growth and Droplet Ejection in a Thermal Inkjet Printer	High Performance Computing Approach for Advanced Polymer Injection Molding Simulation	Phase-Field Simulations of Bubble Formation and Microstructure Interactions in Solidification
	Arthur Rallu, Charbel Farhat	Rekha Rao, Thomas Baer, David Noble	Youngho Suh, Gihun Son	Jacques Duysens, Jean-Pierre La Hargue, Steve Langlois, Michel Nakhle	Ying Sun, Christoph Beckermann
042/069 - Computational Methods for Solid-Solid Phase Transformations					
Marina Room	Keynote: A Phenomenological 1D Model Describing Stress-Induced and Magnetic Solid Phase Transformations.		SMA Constitutive Modeling Incorporating Reorientation Effects and Application to Porous Materials	FE Modelling of Shape Memory Alloys Considering Thermomechanical Couplings and Large Deformations	
	Ferdinando Auricchio, Alessandro Reali, Ulisse Stefanelli		Michele Panico, Catherine Brinson	Marco Schwarze, Daniel Christ, Stefanie Reese	

Monday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
014 - Stabilized, Multiscale and Multiphysics Methods					
Garden Room A	Stabilized FIC/FEM Formulation for Turbulent Incompressible Flows	A Discontinuous Galerkin Method with Solenoidal Elements for Incompressible Flow	Monotone Variational Multiscale Methods	A Locally-Conservative Variational Multiscale Method for Porous Media Flow with Multiscale Sources	Selecting Accurate Multi-Scale Base Functions for Singularly Perturbed Parabolic Problems
	Arif Masud	Harald van Brummelen	Dolores Demarco, Victor M. Calo, J. Austin Cottrell, Thomas J.R. Hughes	Ruben Juanes, Francois-Xavier Dub	Frederic Valentin, Honorio Fernando, Jairo Ramalho
023 - Multidisciplinary Design Optimization - Theory, Methodology, and Application					
Garden Room B	A Metamodeling-based Optimization Approach for Determining Mesoscale Material Properties of AL6022	Optimization of Experimental Designes for Metamodeling	Optimal Selection of Damage Parameters for Composite Crush Modeling	Probability-Based Design Optimization for Transient Fluid-Structure Interaction Problems	
	Peter Hassing, Hongbing Fang	Janis Janusevskis, Janis Auzins, Alexander Janushevskis	Mark Botkin	Qun Zhang, Eng Hui Khor	
021 - Contact and Interface Mechanics: Developments and Applications					
Pacific Concourse A	Simulating Machining of Vibrating Workpiece at a Macroscopic Scale using FEM	Distinct Element Method for Numerical Modelling of Soil Behavior Behind Retaining Walls	Design of Screw Roller with Input Parameters		
	Jean-Vincent Le Lan, Gérard Coffignal, Arnaud Larue, Philippe Lorong	Mohammad Norouz Oliaei	Kudrat Bahadirov, Gayrat Bahadirov		
087 - Mathematical Developments in Modern Topics in Composite Mechanics					
Pacific Concourse B	Optimal Multiphase Structures and New Bounds for Their Effective Properties	A Continuum Mechanics Solution for In-plane Shear Locking in Plate and Shell Elements	Boundary Integral Approach for Some Problems in Linear Viscoelasticity		
	Andrej Cherkaev	David Kellermann, Tomonari Furukawa, Jan Wei Pan	Keijo Ruotsalainen		
012 - Computational Acoustics and Computational Ultrasonics					
Pacific Concourse C	Study of Vibrations in Periodic Media Using Bloch Waves	Computation of First Moduli of Elasticity and Acoustic Tensors for Pre-Stressed Solids	Determination of the Inhomogeneous Plane Waves that Propagate in a Fixed Flux Direction		
	Cristian Barbarosie	Jiri Plesek, Alena Kruisova, Michal Landa	Marc Deschamps, Eric Ducasse		
113 - Higher Order and hp Methods with Applications to Elliptic and Maxwell Problems					
Pacific Concourse D	Experimental Validation of a Mathematical Model	Concentrated Load on a Shell: Numerical Experiments	The Finite Cell Method for Orthopaedic Simulation	A Topologically-Motivated Approach to Geometric Unstructured Multigrid	On the Object Oriented Implementation of HP Adaptive Continuous/Discontinuous FEM Approximations
	Barna Szabo, Sebastian Nervi	Harri Hakula, Antti H. Niemi, Juhani Pitkäranta	Alexander Duester, Jamshid Parvizian, Ernst Rank, Zhengxiong Yang	Alexander Duester, Jamshid Parvizian, Ernst Rank, Zhengxiong Yang	Philippe Devloo, Tiago Forti, Edimar Cesar Rylo
Pacific Concourse E					

Monday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
050 - Meshfree and Generalized/Extended Finite Element Methods					
Pacific Concourse F	Parametric Enrichment Adaptivity by the Extended Finite Element Method	A Quadrature Free Extended Finite Element Method Based on an Quadtree Subdivision.	A Modified XFEM with No Problems in Blending Elements	Simulation of Dislocation Dynamics by an Extended Finite Element Method	
	Haim Waisman, Ted Belytschko	Amine Ouaar, N. Moës, Jean-Francois Remacle	Thomas-Peter Fries	Jay Oswald, Robert Gracie, Ted Belytschko	
016 - Advances and Applications of Meshfree and Extended Finite Element Methods					
Pacific Concourse G	Applications of Meshfree Methods for Ballistic Impact Performance Analysis of Ductile Materials	Analysis of Static Problems on Unbounded Domains by Meshless Method using MLS Basis Functions	Meshfree CVFEM for Solving 2D Flows in Injection Molding Process	Efficient Element-Free Galerkin Explicit Dynamic Simulations	Analysis of Beams and Plates Using Modified Sinc Method Based on Approximating Highest Derivatives
	Murat Buyuk, Steve Kan, C. T. Wu	Kaushik Das, R. Batra	Kemelli Estacio, Graham Carey, Norberto Mangiavacchi, Luis Gustavo Nonato	Hui-Ping Wang, Yong Guo, Henry Schuyten, C. T. Wu	Wesley Slemp, Rakesh Kapania
034 - Turbulence Simulation: Methods and Applications					
Pacific Concourse H	Simulation of Transition on a Compressor Blade	Convergence Studies of Turbulent Channel Flows Using a Stabilized Finite Element Method	Turbulence in Abdominal Aorta Aneurysms	Direct Numerical Simulation of Turbulent Cylinder Flow at Re=10,000	Lagrangian Methods for Investigating Flow Structure Effects on Turbulent Transport
	Paul Durbin, Tamer Zaki	Andres Tejada-Martinez, Kenneth Jansen, Richard Lahey, Alisa Trofimova	Kenneth E. Jansen, Onkar Sahni, C.A. Taylor	Steven Dong	Phuong Le, Dimitrios Papavassiliou
015/041 - Advances in Multiphysics Behavior, Fracture, and Plasticity Analyses at the Nanoscale					
Pacific Concourse I	Applicability of the Griffith Criterion to the Fracture of Crystal Lattices with Nano-sized Flaws	Fracture of Oxygenated Graphene Sheets by Quantum to Molecular Overlaid Domain Decomposition Method	From Individual Properties of Dislocation to Collective Properties of Dislocations	Computational Material Modeling of Hardness in Nanocomposites	
	Sulin Zhang, Ted Belytschko, Ting Zhu	Roopam Khare, Ted Belytschko, Steven Mielke, Jeffrey Paci, George Schatz	Sebastien Groh, Mark Horstemeyer, Bohumir Jelinek	Suresh Moorthy	
029 - Computational Methods in Bioengineering					
Pacific Concourse J	NURBS-Based Approach for Modeling Voluntary Contraction of Skeletal Muscles	Numerical Studies of a Constitutive Model of Muscle Properties in a Soft-Bodied Arthropod	Numerical Simulations to Predict Breast Shape in Breast Reconstructive Surgery	Biomechanical Sensitivity Analyses of Tactile Sensation Phenomena	Low Frequency Wave Propagation in a Spiral Cochlea
	Sheng-Wei Chi, J. S. Chen, Reggie Edgerton, David Shin, Shantanu Sinha	Kingshuk Bose, A. Luis Dorfmann	Alok Sutradhar, Michael Miller	Tomaz Rodic, Tomaz Sustar, Primoz Sustaric	Daphne Manoussaki, Richard Chadwick, Emilios Dimitriadis
020 - Computational Methods in Impact Engineering					
Pacific Concourse K	Analysis and Feasibility of Active Plate Deployment Strategies for Blast Mitigation	Reliability Analysis of Impact Behavior Concrete	Modeling High Strain-Rate Testing of Metal Laminates	A 3D FE Model with Combined Physical and Kinetic Factors for Peening Residual Stress in Multi-Impact	
	Nayden Kambouchev, Raul Radovitzky	Fariborz Vossoughi	Charles Randow, George Gazonas	Taehyung Kim, Hyungyil Lee	
003 - Discontinuous Galerkin methods for PDEs					
Pacific Concourse L	Plane Wave Discontinuous Galerkin Methods for the Helmholtz Equation	A Discontinuous Galerkin Approach for Solving the Boltzmann Equation	On the Coupling of Incompressible Flow with Darcy Flow	The Direct Discontinuous Galerkin(DDG) Methods for Diffusion Problems	
	Ilaria Perugia, Ralf Hiptmair	Lowell Baker, Nicolas Hadjiconstantinou	Beatrice Riviere	Jue Yan	

Monday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
107 - Modeling and Solution Methods for Coupled Problem Simulation					
Pacific Concourse M	Simulation of Electrostatic-Structural Coupling using Fictitious Domain and Level Set methods.	Hybrid Coupling of Multi-Scale Problems in Computational Aeroacoustics	A Message-Passing Approach for Coupled, Buoyancy-Driven Fluid Flow and Heat Transfer Problems	Advanced Simulation Tools for the Composite Cure-Thermal-Mechanical Processes	
	Andriy Andreykiv, Daniel Rixen	Sabine Roller	Peng Hu, Zhongman Ding, Jianhui Xie	Sheng Ping Wang	
112 - Minisymposium on Adaptive Modeling in Computational Mechanics					
Pacific Concourse N	The Seamless Bridging of Scales in Continuum Modeling based on Error Control	3D Anisotropic H-Adaptive Finite Element Scheme for Thermo-Mechanical Analyses	Adaptive Control of Modeling Error for an Atomistic-to-Continuum Coupling Method	Hermite-based Error in Mesh Adaptation	
	Fredrik Larsson, Kenneth Runesson	Panagiotis Michaleris, Shih-Horng Tsau	Serge Prudhomme, Paul Bauman	Lakhdar Remaki, Wagdi G Habashi	
082 - Structural Reliability Analysis					
Pacific Concourse O	Reliability-Based Design Optimization of Space Trusses	Reliability Evaluation of Bridge Structures Using Covariance Structure Analysis	Reliability Assessment of Automotive Electronic Hardware using Virtual Qualification		
	Anderson Pereira, Luiz Fernando Martha, Luiz Eloy Vaz	Jun Takeda, Hitoshi Furuta	Hae-Jin Lee, Jung-Youn Lee, Jae-Eung Oh		

Tuesday, July 24

Technical Session 4 – Morning Session
9:45 – 11:35 am

Technical Session 5 – Afternoon Session
2:10 – 4:00 pm

Technical Session 6 – Late Afternoon Session
4:30 – 6:20 pm

Peter Wriggers
Universität Hannover

Material Characterization by Multi-Scale Simulations

Tuesday, July 24th, 8:15 – 9:15 a.m., Grand Ballroom A

Multi-scale models can be extremely helpful in the understanding of complex materials used in engineering practice. In the presentation the basic theoretical strategy is developed. Possible finite element methods to solve such problems are explained in detail and discussed. These are based on homogenization techniques but also on true multi-scale solutions. The developed methodology is then applied to a specific engineering materials like concrete or granular soil. Concrete has to be investigated on three different scales, the hardened cement paste, the mortar and finally the concrete. Here a successive two-stage approach is followed in which first the multi-scale model of the cement paste and mortar is applied. The resulting homogenization can then used in a multi-scale mortar-concrete model. For the granular material homogenization is computed based on a three-dimensional discrete element model accounting for the frictional interface forces between the particles.

The model for the hardened cement paste is based on a three-dimensional computer tomography at the micrometer length scale. For this a finite element model is developed with different constitutive equations for the three parts unhydrated residual clinker, pores and hydrated products. The constitutive equations at the micro-scale contains inelastic parameters, which cannot be obtained through experimental testings. Therefore, one has to solve an inverse problem which yields the identification of these properties. For computational efficiency and robustness, a combination of the stochastic genetic algorithm and the deterministic Levenberg-Marquardt method is used. In order to speed-up the computation time significantly, a client-server based system is used. Hence, all calculations are distributed automatically within a network environment. The resulting constitutive parameters on the micro-scale are then used in the homogenized constitutive model for the mortar. But also in the multi-scale model for the mortar. Both results are compared with each other but also with experimental data.

Further interesting applications occur for coupled problems where the interaction of freezing water and material has to be considered at micro-scale. The expansion of the ice leads to damage in the micro-structure which yields an inelastic material behavior on the macro-scale. If such a calculation is performed for different moistures and temperatures, a correlation between moisture, temperature and the inelastic material behavior is obtained. Numerical examples show, that the developed approach reproduces the material behavior realistically.

Mary F. Wheeler
The University of Texas at Austin

Multiscale Discretizations for Flow, Transport and Mechanics in Porous Media

Tuesday, July 24th, 1:00 – 2:00 p.m., Grand Ballroom A

A fundamental difficulty in understanding and predicting large-scale fluid movements in porous media is that these movements depend upon phenomena occuring on small scales in space and/or time. The differences in scale can be staggering. Aquifers and reservoirs extend for thousands of meters, while their transport properties can vary across centimeters, reflecting the depositional and diagenetic processes that formed the rocks. In turn, transport properties depend on the distribution, correlation and connectivity of micron sized geometric features such as pore throats, and on molecular chemical reactions. Seepage and even pumped velocities can be extremely small compared to the rates of phase changes and chemical reactions. The coupling of flow simulation with mechanical deformations is also important in addressing the response of reservoirs located in structurally weak geologic formations.

We will focus on the mortar mixed finite element method (MMFE) which was first introduced by Arbogast, Cowsar, Wheeler, and Yotov for single phase flow and later extended to multiphase flow by Lu, Pesyznska, Wheeler, and Yotov for multiphase flow. The MMFE method is quite general in that it allows for non-matching interfaces and the coupling of different physical processes in a single simulation. This is achieved by decomposing the physical domain into a series of subdomains (blocks) axnd using independently constructed numerical grids and possibly different discretization techniques in each block. Physically meaningful matching conditions are imposed on block interfaces in a numerically stable and accurate way using mortar finite element spaces. The mortar approach can be viewed as a subgrid or two scale approach. Moreover, the use of mortars allows one to couple MFE and discontinuous Galerkin approximations in adjacent subdomains. In this presentation we will discuss theoretical a priori and a posteriori results and computational results will be presented.

Tuesday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
111 - Computational Solid Mechanics: Recent Advances					
Grand Ballroom B	Algorithms for the Solution of Problems in Gradient Plasticity	Tinsley-ian Mechanics: From Before I Heard of FEA Through Today	A Fixed-Mesh Representation of Flow-Structure Interactions with Large Solid Deformation	Geometry-Preserving Computation of High-Order Time-Integration in Computational Plasticity	
	Daya Reddy, Andrew McBride	Ed Akin	Hong Zhao, Jonathan Freund, Robert Moser	Karsten Quint, Stefan Hartmann	
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	Keynote: Computation with uncertainty		Parallel Performance of Advanced Structural Reliability Algorithms	On Optimization Techniques to Reconstruct Microstructures of Random Heterogeneous Media	Computationally Efficient Bayesian Inference for Random Fields with Gaussian Process Priors
	Alexandre Chorin		Manuel Pellissetti	Edoardo Patelli, Gerhart Schueller	Youssef Marzouk, Habib Najm
074 - Cohesive Models of Fracture, Branching, and Fragmentation					
Regency A	Keynote: A Novel Potential-Based Approach for Mixed-Mode Cohesive Fracture Simulation		Thin Film Buckling and Wrinkling on Cohesive Foundations	Modelling of Environmentally Assisted Slow Crack Growth in Ceramic Polycrystals	Multiscale Cohesive Failure Modeling of Heterogeneous Adhesives
	Glaucio Paulino, Kyoungsoo Park, Jeffery Roesler		Kartik Srinivasan, Sanjay Goyal, Thomas Siegmund, Ganesh Subbarayan	Rafael Estevez, Yann Charles, Jerome Chevalier, Christian Olagnon, Marc Romero de la Osa, Christophe Tallaron, Lionel Vignoud	Mohan Kulkarni, Philippe Geubelle, Karel Matous
Regency B					
063 - Pavement Mechanics and Simulation					
Plaza Room	Responses of a Transversely Isotropic Pavement to Multiple Shear Loads	Lattice Models of Rigid Pavement Systems	New Evaluation Method and Software for Multilayered Pavement Structure	Framework for Consideration of Aging and Thermal Gradients in Asphalt Concrete Pavements Simulations	
	Yuanguo Chen, Ernie Pan	Sri Ramya Duddukuri, John Bolander	Wael Alkasawneh, Ernie Pan	Eshan V. Dave, William Buttlar, Glaucio Paulino	
066 - Modeling and Simulation of Nano Materials and Mechanics					
Bayview A	1D Crystalline Structures: Fabrication and Mechanics	Ultra-thin Helical Nanowires: Structure, Stability, and Nanomechanical Response	Finite Element Modeling of Crystal Surface Growth	Equilibrium and Non-Equilibrium Quasi-Continuum at Finite Temperature	A Discrete Mechanics Approach to Forest-Hardening in BCC Crystals
	Hanchen Huang	Cristian Ciobanu	Peter Chung, John Clayton, M Grinfeld, William Nothwang	Yashashree Kulkarni, Jaroslaw Knap, Michael Ortiz	Ashwin Ramasubramaniam, Michael Ortiz
047 - Recent Advances in Modeling of Engineering Materials/Systems					
Bayview B	Keynote: Improved Modal Pushover Analysis of Multi-span Continuous Bridge Structures and Its Applicability.		Behavior of a Long-term Tensile Force Measurement Device	Shape Optimization of Ceramic Jar and Its Comparison with Traditional Pieces	T-spline Finite Element Method with Local Refinement
	H.G. Kwak, Dong Kyu Shin		Kyung-Jae Shin, Whajung Kim, Swoo-Heon Lee	Sang-Woo Han, Hyun-Wook Kwon, Whajung Kim, Young-Doo Kwon	Tae-Kyoung Uhm, Hyun-Jung Kim, Yu-Deok Seo, Sung-Kie Youn

Tuesday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
116 - Computational Biology, Biomechanics and Biomedicine					
Seacliff A	Keynote: The Network of Sequence Flow Between Protein Structures		Optimal Cancer Treatment Planning Through the Integration of Nanotechnology and Computer Simulation – a Biological Based Approach	A Data Driven Application System For Laser Treatment of Cancer	Computational Modeling Quantifies Biophysical Barriers to Tumor Drug Delivery and Effect
	Ron Elber		Marissa Rylander	David Fuentes, Ivo Babuska, Chandrajit Bajaj, James Browne, Kenneth Diller, John Hazle, J. Tinsley Oden	Vittorio Cristini
109 - Partition of Unity Finite Element and Meshless Methods: Advances and Engineering Applications					
Seacliff B	Enriched Meshfree Methods for Crack Problems	An X-FEM Multigrid Algorithm for Multiscale Crack Growth Simulations in Industrial Structures.	Analysis of 3-D Interacting Cracks Using a Parallel Adaptive Generalized Finite Element Method	Global-Local Finite Cover Method for Deteriorating Structures by Locally Propagating Cracks	
	Timon Rabczuk, Ted Belytschko, Stephane Bordas, Goangseup Zi	Johann Rannou, Marie-Christine Baietto, Anthony Gravouil	Dae-Jin Kim, A. Duarte, Nahil Sobh, Mark Straka	Mao Kurumatani, Kenjiro Terada	
024 - Computational Formulations Involving Shell and Other Thin-Walled Structures					
Seacliff C	On the Accuracy of Classical Engineering Models for a Stiffened Shell Roof	A Corotational Formulation for Triangular Curved Composite Shell Element	Dynamics of Nonlinear Rods and an Exact Conserving Integration Algorithm	First Order Shear and Normal Deformable Plate Theory for Neo-Hookean Materials	
	Juhani Pitkäranta	Zhongxue Li, Loc Vu-Quoc	Eduardo M. B. Campello, Paulo M. Pimenta	Alper Erturk, R. Batra	
022 - Computational Geometry and Analysis					
Seacliff D	Models of Geometry for Isogeometric Analysis of Deformations	Simulation of Sliding Contact of Curved Thin Shells using Subdivision Finite Elements	Isogeometric Analysis Using RKEM	Three-dimensional Geometrically Adaptive Integration	Convergent Adaptive Approximation of Nonlinear Geometric PDE
	Elaine Cohen	George Turkiyyah	D. C. Simkins	Brian Luft, Vadim Shapiro, Igor Tsukanov	Michael Holst
092 - Modeling and Simulation of Multi-Phase and Multi-Material Flows					
Golden Gate Room	An Enthalpy/ Narrow-Band Level-Set Method with Application to Two Non-Standard Stefan Problems	Cahn-Hilliard Phase Decomposition and Directed Pattern Assembly	Using CFD to Study the Effects of the Fiber on the Air Flow for Slot Die Melt Blowing	Modelling of Large Scale Venturi Scrubbers	
	Vaughan Voller	Roy Stogner, Graham Carey	Holly Krutka, Dimitrios Papavassiliou, Robert Shambaugh	Jose Teixeira, Angela Silva, Senhorinha Teixeira	
042/069 - Computational Methods for Solid-Solid Phase Transformations					
Marina Room	Numerical Modelling of Solidification in a Micro-Macro Scale Using the Control Volume Method	Generalization of the Micro/Macro Solidification Model	Computational Modeling of Shock Compression of Ice	Phase Transformation Waves in Heterogeneous Systems with Solid Phases	
	Bohdan Mochnacki, Mariusz Ciesielski	Romuald Szopa	Vladimir Tchijov, Gloria Cruz-Leon, Suemi Rodriguez-Romo, Felipe Vargas-Torres	Michael Grinfeld, Pavel Grinfeld	
Garden Room A					

Tuesday - Morning Session					
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023 - Multidisciplinary Design Optimization - Theory, Methodology, and Application					
Garden Room B	Optimal Restoration Scheduling of Damaged Networks in Uncertain Environment Using Improved GA	An Intelligent Algorithm for Performance Assessment of Non- Homogeneous Decision Making Units	An Integrated Fuzzy Regression Algorithm and Time Series for Energy Consumption Estimation	Power Saving Schemes Through Automated Light Control and Natural Light Harvesting Mechanisms	
	Koichiro Nakatsu, Hitoshi Furuta	Ali Azadeh, Mona Anvari, Morteza Saberi	Morteza Saberi, Ali Azadeh, Anahita Gitiforouz	Brijendra Tripathi	
096 - Models and Methods in Computational Vascular and Cardiovascular Mechanics					
Pacific Concourse A	Keynote: Compuational Mechanics, Nanotechnology and Medicine: a Three-body		On the Margination Dynamics of NanoParticles within a Capillary Flow	Mathematical Models and Numerical Simulation of Drug Release from Stents	Numerical Investigation of Blood Flow and Drug Transport in Patient-Specific Coronary Arteries
	Mauro Ferrari		Paolo Decuzzi, Mauro Ferrari, Milos Kojic	Paolo Zunino, Christian Vergara	Shaolie Hossain, Yuri Bazilevs, Nathan Brasher, Victor M. Calo, Thomas J.R. Hughes
104 - Computational Techniques Related to Configurational Mechanics					
Pacific Concourse B	VALE Finite Element Models in Fracture Mechanics	3D Configurational-Force-Driven Crack Propagation with r-h-Adaptive Mesh Alignment and Refinement	Variational Mesh Adaption for Standard Dissipative Solids Based on Configurational Forces	Analysis of Defects in Ferroelectric Materials Using Configurational Forces	
	Fernando Fraternali, Matteo Negri, Michael Ortiz, Anna Pandolfi	Christian Miehe, Ercan Guerses, Dominik Zimmermann	Joern Mosler, Michael Ortiz	Ralf Mueller, Dietmar Gross	
075 - Mechanics of Living Materials: Experimentation, Modeling and Simulation					
Pacific Concourse C	Biomechanics of Enlarging Intracranial Aneurysms Toward Patient Specific Modeling	Competing Remodeling Mechanisms in the Development of Saccular Aneurysms	Theoretical and Experimental Studies of Stress-Modulated Remodeling of a Non-Homogeneous Body	Adaptive Response of Blood Vessels: Mathematical Modeling and Computer Simulation	Finite Element Modeling of the Looping of the Embryonic Heart Including Mechanical Feedback
	S. Baek, C. A. Figueroa, J. D. Humphrey, C.A. Taylor	Vittorio Sansalone, Antonio DiCarlo, Amabile Tatone, Valerio Varano	Elena Di Martino, Davide Ambrosi, Anna Guillou, David Schwartzman	Paola Nardinocchi, Antonio DiCarlo, Luciano Teresi	Larry Taber, Nandan Nerurkar, Ashok Ramasubramanian
113 - Higher Order and hp Methods with Applications to Elliptic and Maxwell Problems					
Pacific Concourse D	HP-FE Modeling of Scattering from Cavity-Backed apertures employing Maxwell eigenfunctions	Fourier Finite Element Approximations of Maxwell's Eigenvalue Problems in Axisymmetric Domains	A Comparison of Solution Techniques for Linear Systems for H(curl) Problems	On the Use of High Order H(curl) Finite Elements for Electromagnetic Inverse Problems.	Nonconforming Finite Element Maxwell Eigensolvers
	Waldek Rachowicz, Adam Zdunek	Fumio Kikuchi, Kyohei Kokubo	Paul Ledger	Daniel White, Mark Stowell	Fengyan Li, Susanne Brenner, Li-yeng Sung
105 - Numerical Techniques for the Modeling of Failure in Solids					
Pacific Concourse E	Keynote: Computational Multiscale Studies of Nanofracture		A Multiscale Model for Material Softening	A New Integration Scheme to Increase Robustness in Computational Material Failure Models	A Comparative Study of a Hierarchy of Finite Elements Formulations with Embedded Discontinuities
	Ted Belytschko		Frederic Hilchenbach, Thomas Hettich, Andrea Hund, Ekkehard Ramm	Javier Oliver, Alfredo E. Huespe	Jaime Retama, Gustavo Ayala, Gelacio Juarez Luna

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050 - Meshfree and Generalized/Extended Finite Element Methods					
Pacific Concourse F	Meshfree Analysis of Shell and Beam Structures with Tangent Discontinuity	Simulation of Earthmoving/Demolition Operations Using Corrected Smooth Particle Hydrodynamics (CSPH)	Toward a Mesh-Free, Compatible Representation of Magnetohydrodynamic Systems	Adaptive Element Free Garalerkin Method Including Nodal Relocation Method of Boundary	
	H. Noguchi, J. S. Chen, Zhiqian Zhang	J. Gaidos	Jeffrey Johnson, J. Michael Owen	Seiya Hagihara, Shinji Sasaki	
016 - Advances and Applications of Meshfree and Extended Finite Element Methods					
Pacific Concourse G	Scan-and-Solve Approach for Field Modeling in Acquired Geometric Models	A Massively Parallel Processing for Meshfree Method in LS-DYNA	Air-Blast Analysis of Beam-Columns using Galerkin Formulation	Higher Order Approximation Using Correction Terms in the Meshless Finite Difference Method	
	Michael Freytag, Vadim Shapiro, Igor Tsukanov	Jingxiao Xu, Hui-Ping Wang, C. T. Wu	Arturo Montalva, Salvador Ivorra, Shalva Marjanishvili	Janusz Orkisz, Slawomir Milewski	
052 - Recent Developments in Nanoscale Simulations: From Quantum to Coarse-Grained Modeling					
Pacific Concourse H	Keynote: Cytoskeletal Dynamics Simulations of Red Blood Cell		Quantitative Insights into Dislocation Nucleation by Nanoindentation	Surface Cauchy-Born Modeling of Resonant Mass Sensing	
	Ju Li, Ming Dao, George Lykotrafitis, Subra Suresh		Yuan Zhong, Ju Li, Ting Zhu	Harold Park, Patrick Klein	
015/041 - Advances in Multiphysics Behavior, Fracture, and Plasticity Analyses at the Nanoscale					
Pacific Concourse I	Keynote: Thermoelectric Characterization of Nanostructures using a Nanofabricated Test Platform		Dynamic Fracture Analyses of SiC-Si3N4 Nanocomposites with Explicit Account of Grain Boundaries	Phase-Transformation-Induced Thermomechanical Coupling in ZnO Nanowires	
	Li Shi, Anastassios Mavrokefalos, Michael Pettes, Feng Zhou		Vikas Tomar	Ambarish Kulkarni, Min Zhou	
029 - Computational Methods in Bioengineering					
Pacific Concourse J	Keynote: Molecular simulation of amyloid fibrils: formation and structure		A Finite Element Framework for Computation of Protein Normal Modes and Mechanical Response	Computer-Aided Engineering of Molecular Motors to Move Toward Opposite Directions	Protein Solvation Energies from 3D Electron Microscopy
	Wonmuk Hwang		Mark Bathe	Jung-Chi Liao, Zev Bryant, Scott Delp, James Spudich	Shun-Chuan Chen, Chandrajit Bajaj, Samrat Goswami, Wenqi Zhao
020 - Computational Methods in Impact Engineering					
Pacific Concourse K	Estimation of Design Parameters for Split Hopkinson Pressure Bar for Dynamic Testing of Foams	Impact and Spallation in Brittle Solids using Peridynamics	The Large-Strain Rate-Dependent Mechanical Behavior of PolyTetraFluoroEthylene (PTFE)	Metal Sandwich Plates Subject to Shock Loading: Response, Failure and Design Optimization	
	Spandan Maiti, Siladitya Pal, Ghatu Subhash	Wei Xie, Florin Bobaru	Sai S Sarva, Mary C Boyce, Wayne Chen, Robert E Cohen, Walter Mahler, Sharon Y Soong	Ashkan Vaziri, Zhenyu Xue	
003 - Discontinuous Galerkin Methods for PDEs					
Pacific Concourse L	Automated Code Generation for Discontinuous Galerkin Methods	Lagrangian Simulations of Unconstrained 3D Plastic Flows by Mesh Healing and Adaptive Optimization	The Mixed Discontinuous Galerkin Method(s): Accurate Computation of Viscoelastodynamics	Spacetime Discontinuous Galerkin Method with Sub-cell Shock Capturing and Discontinuity Tracking	
	Kristian Ølgaard, Garth N. Wells	Raul Radovitzky, Ludovic Noels	Saurabh Srivastava, Abani Patra	Robert Haber, Jayandran Palaniappan	

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114 - Multiple Scaling and Homogenization for Mechanics and Design Optimization					
Pacific Concourse M	On the Curvature and Torsion Effects in One Dimensional Waveguides	Some Applications of Numerical Material Testing with Microstructures in Nolinear CAE	Computational Design of Multiphase Microstructure Composites for Extremal Conductivity		
	Luísa Mascarenhas	Kenjiro Terada, Noboru Kikuchi	Qing Li		
094 - Finite Elements for Large Strain Problems					
Pacific Concourse N	Solid-Shell Finite Element Technology - Adaptive Hourglass Stabilization and Further Improvements	An Improved 3-D Brick Cosserat Point Element (CPE) for Nonlinear Elasticity	An Improved Cosserat Point Element (CPE) for Axisymmetric Problems in Nonlinear Elasticity	Stability of Some Galerkin Schemes for Large Deformation Elastic Problems	
	Stefanie Reese, Marco Schwarze	MIles B. Rubin, Mahmood Jabareen	Mahmood Jabareen, MIles B. Rubin	Carlo Lovadina, Ferdinando Auricchio, Lourenco Beirao da Veiga, Alessandro Reali	
077 - New Actuators and Mechanisms					
Pacific Concourse O	State of the Art and Trends in Actuation Technology	'Programming' the Material World	Physio-Cognitive Basis for the Design of Touch Stimulating Surfaces	An Agonist-Antagonist Actuator for Artificial Leg Joints	Structure-Preserving Model Reduction for Damped Resonant MEMS
	Ramiro Velazquez, Edwige Pissaloux	Marcelo Coelho	Edwige Pissaloux, Eléanor Fontaine, Ramiro Velazquez	Ernesto C. Martinez-Villalpando, Hugh Herr	David Bindel

Tuesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
111 - Computational Solid Mechanics: Recent Advances					
Grand Ballroom B	New Developments on Mixed Least-Squares Finite Element Models Forlaminated Composite Plates	Mixed Finite Element Methods for Elasticity	Macro-Hybrid Finite Element Analysis of Mixed Variational Inclusions	Applications of Algebraic Geometry Methods to Damage Detection in Plates with Large Deformation	A New Shear Deformable Beam Finite Element
	Cristovao Mota Soares, Filipa Moleiro, Carlos Mota Soares, J. N. Reddy	Douglas Arnold, Richard Falk, Ragnar Winther	Gonzalo Alduncin	Jane Liu	Rameshchandra Shimpi
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	Accelerated Fuzzy FEM Based on Iterative Linear System Solver for Uncertainty Treatment in Statics	Partition of Probability-Assigned Parametric Space in Probability Density Evolution Analysis	Computational Framework for Simulation of Stochastic Geomeaterials	On the Validation of Structural Models under Uncertainty	Polynomial Chaos Expansions for Acoustic Field Uncertainty in Shallow Water Waveguides
	Laszlo Farkas, David Moens, Dirk Vandepitte	Jianbing Chen, Roger Ghanem, Jie Li	Kallol Sett, Boris Jeremic	Helmut Pradlwarter	Kevin LePage
074 - Cohesive Models of Fracture, Branching, and Fragmentation					
Regency A	Adaptive Dynamic Cohesive Fracture Simulation Using Edge-Swap Operators	Failure of Thermoelastoviscoplastic Particulate Composites by Cohesive Zones	Extrinsic Cohesive Zone Modeling of Dynamic Mixed-mode Fracture Using a Topological Data Structure	Analysis of Sub Sea Wellhead Systems: Model Generation and Preprocessing Issues	Computation of T-Stress for Cracks in Three-Dimensional Functionally-Graded Solids
	Kyoungsoo Park, Waldemar Celes, Glaucio Paulino	Bryan Love, R. Batra	Zhengyu Zhang, Glaucio Paulino	Jose Alves, Lucia Coelho, Carlos da Silva, Nestor Guevara, Jr., Carmen Paz	M.C. Walters, Glaucio H. Paulino, Robert H. Dodds Jr.
025 - Modeling and Computation of Active Small (Nano) Systems Issues for Small Systems					
Regency B	The Fluctuation & Dissipation Theorems, Theory & Experiment	Non-Linear Duffing Oscillator Equation for Dynamic Analysis of Polarization in Ferroelectrics	Toward a Coarse-Grained Model of the Myosin V Neck	An Atomistic-Continuum Cosserat Rod Model of Carbon Nanotubes	
	Denis Evans	Asis Kumar Bandyopadhyay	David Parker, Scott Delp, Jung-Chi Liao	Karthick Chandraseker, Subrata Mukherjee	
063 - Pavement Mechanics and Simulation					
Plaza Room	Inverse Computation of Mode I Cohesive Properties from Displacement Field	Identification Procedure for Viscoelastic Materials Using Iterative Functions	Multiscale Prediction of Strength Properties of Asphalt by means of Limit Analysis	Revision of Pavement Design Method: South African Approach	
	Bin Shen, Glaucio Paulino	Lev Khazanovich, Mihai Marasteanu, Adam Zofka	Josef Eberhardsteiner, Josef Füssl, Roman Lackner	James Maina	
066 - Modeling and Simulation of Nano Materials and Mechanics					
Bayview A	Multi-Scale Simulation Approaches to Nanotribology	Development of New Atomic Force Microscopy Capabilities through Multi-scale Simulation	Frictional Dynamics at the Atomic Scale in Presence of Small Oscillations of the Sliding Surfaces	Hydration Force Mechanism in Aqueous Solutions	
	Izabela Szlufarska	Santiago Solares, Balakumar Balachandran, Gaurav Chawla	Yehuda Braiman	Yongsheng Leng, Peter Cummings	

Tuesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
047 - Recent Advances in Modeling of Engineering Materials/Systems					
Bayview B	Development of Immersed Rigid Body Method for Coupled System of Fluid and Particles Cluster	Software System to Perform Crack Propagation Analyses for Arbitrary-Shaped Three-Dimensional Flaws	Mesoscale Computational Modeling of Materials Based on High-Fidelity Microstructural Reconstruction	Computational Modeling of Crack Initiation in Cross-roll Piercing	Implementation of an Elastic Creep Model to Nonlinear Shell Elements in LS-DYNA
	Gaku Hashimoto, H. Noguchi, Taiki Yasuzaka	Hiroshi Okada, Hiroshi Kawai, Genki Yagawa	M.A. Siddiq Qidwai, Andrew Geltmacher, Alexis Lewis, David Rowenhorst, George Spanos	Sudhir Chiluveru, Raul Radovitzky	Yun Huang
116 - Computational Biology, Biomechanics and Biomedicine					
Seacliff A	Modeling Bioheat Transfer and Cell Damage Under Hyperthermia Condition in Human Prostate	A Sensitivity Study of the Pennes Bioheat Transfer Model to Source Term Parameters	Effect of Shape on Growth and Remodeling of Intracranial Fusiform Aneurysms	On the Static and Dynamic Behaviour of the Middle Ear Considering Tympanic Perforations	Representing the Digital Body: an Ethnographic Study of Scientists' Practices of Creating Computer m
	Yusheng Feng, J. Tinsley Oden, M. Nichole Rylander, Devashish Shrivastava	Andrea Hawkins, Yusheng Feng, David Fuentes, J. Tinsley Oden	Fred Nugen, Yuri Bazilevs	Fernanda Gentil	Marko Monteiro
109 - Partition of Unity Finite Element and Meshless Methods: Advances and Engineering Applications					
Seacliff B	Modeling Fracture in Integrated Thin Film Structures by the Extended Finite Element Method	Crack Evolution in Thermal Barrier Coatings	A High Order Generalized Finite Element Method for Arbitrary 3D Cracks	A Robust Numerical Framework to Study Failure in Quasi-Brittle Materials	Modeling Inelastic Cohesive Interfaces Through a Regularized Extended Finite Element Formulation.
	Rui Huang	Thomas Hille, Akke Suiker, Sergio Turteltaub	Jeronymo Pereira, A. Duarte, Damrong Guoy, Xiangmin Jiao	T. Christian Gasser	Elena Benvenuti
024 - Computational Formulations Involving Shell and Other Thin-Walled Structures					
Seacliff C	Classical Higher-Order Shell Formulations: An Overwiev and Application to Shell Optimum Design	The Finite Element Analysis of Pipe Bends with Straight pipes Subjected to In-plane Bending	Shear Forces in Plate Yield-line Elements	Thin-Walled Beam Theory Considering In-Plane Cross-Section Distortion	
	Bostjan Brank, Marko Kegl	Seiichi Ohtaki, Toshiaki Horiuchi, Michitaro Obara	Mitchell Gohnert, David Blittenthall	Fang (Flora) Yiu, Katerina Papoulia	
Seacliff D					
017 - Non-Invasive Sensing of Subsurface Properties					
Golden Gate Room	Net Pay Evaluation From Acoustic and Shear Impedance Inversion of Seismic Data	Simulation of Borehole Acoustic Measurements with Adaptive Finite Elements	Numerical Simulation of 3D Borehole Resistivity Measurements Using an hp-Adaptive Goal-Oriented FEM.	A Nested Dissection Parallel Direct Solver for Simulations of 3D DC/AC Resistivity Measurements	Simulation of Electromegnetic Waves in Cylindrical Layered Media with the Axial Hybrid Method
	Lev Vernik	Christian Michler, Leszek Demkowicz, David Pardo, Carlos Torres-Verdin	David Pardo, Maciej Paszynski, Carlos Torres-Verdin	Maciej Paszynski, David Pardo, Carlos Torres-Verdin	Gong Li Wang, Carlos Torres-Verdin, Stan Gianzero

Tuesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
053 - Computational Methods in Image Analysis					
Marina Room	CartX: A Homeland Security Application at the Convergence of Simulation and VirtualReality	Image Segmentation of Fluorochrome-Labeled Diffuse Damage in Trabecular Bone	Medical Diagnostic System Driven by Pattern Recognition and Collaborative Learning	Volumetric 3D Rreconstruction and Characterization of External Anatomical Structures from Images	Content Base Image Retrieval Using Two Pass Algorithm
	Eric Bouvier, Olivier Balet, Jean-Pierre Benoit, Jacques Duysens, Olivier Isnard, Christophe Nouguier	Karen Warden, Dwight Davy	Daniela Ushizima, Marta Rosatelli	Joao Manuel R. Tavares, Teresa Azevedo, Mario Vaz	Shital Raut
009 - Computational Methods in Biological Growth and Remodeling					
Garden Room A	A Multiphase Continuum Approach for Growth and Remodeling in Biological Materials	Growth and Remodeling of Thick-Walled Arteries Including Longitudinal Curvature	Computational Modeling of Time-Dependent Fiber Reorientation in Biomaterials	Time and Stress Dependent Growth Model	Modelling Osseointegration in Living Interfaces: Application to Cementless Hip and Dental Implants
	Tim Ricken, Joachim Bluhm	Patrick Alford, Larry Taber	Grieta Himpel, Ellen Kuhl, Andreas Menzel, Paul Steinmann	Samer Adeeb, Marcelo Epstein, Walter Herzog	Maria Angeles Perez, Manuel Doblare, Jose Manuel García-Aznar, Pedro Moreo
083 - Particle Methods in Continua and Discontinua Mechanics					
Garden Room B	Numerical Analysis of Fluid-Structure Interaction for Boimechanics using a Particle Method	Hamiltonian Particle-Element Models of Noncontinuum Impact Physics	The Particle Finite Element Method in Fluid-Structure Interaction Problems		
	Seiichi Koshizuka	Eric Fahrenthold	Sergio Idelsohn, Eugenio Oñate		
096 - Models and Methods in Computational Vascular and Cardiovascular Mechanics					
Pacific Concourse A	Biochemomechanics of Cerebral Vasospasm and its Resolution	Patient-Specific Vascular NURBS Modeling for Isogeometric Analysis of Blood Flow	Numerical Simulation of Wall Tension in Cerebral Aneurysms	Recent Advances in the Numerical Simulation of Fluid Structure Interaction in Haemodynamics	Effects of the Carotid Artery Bifurcation Geometry on the Risk to Develop Atherosclerosis
	J. D. Humphrey, S. Baek, A. Valentin	Yongjie Zhang, Chandrajit Bajaj, Yuri Bazilevs, Samrat Goswami, Thomas J.R. Hughes	Trond Kvamsdal, Yuri Bazilevs, Tor Ingebrigtsen, Jørgen Isaksen, Jon Harald Kaspersen, Bertil Romner, Knut Waterloo, Yongjie Zhang	Fabio Nobile	Dimitrios Papavassiliou, Kien Nguyen
104 - Computational Techniques Related to Configurational Mechanics					
Pacific Concourse B	On Energy-Based Mesh Optimization in Finite Hyperelastostatics	On the Role of Material Dissipation for the Crack-Driving Force	Discrete Material Forces in Molecular Dynamics	A Two-Scale Computational Approach to Damage in Solids	
	Paul Steinmann, Michael Scherer	Johan Tillberg, Kenneth Runesson	Ralf Denzer, Paul Steinmann	Cristian Dascalu, Gabriela Bilbie	

Tuesday - Afternoon Session					
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075 - Mechanics of Living Materials: Experimentation, Modeling and Simulation					
Pacific Concourse C	Physical and Numerical Modeling of the Plasma Membrane	Elasticity of Dendritic Actin Networks	Topological Curation for Accurate Micro-Mechanical and Mesoscopic Modeling of Trabecular Bone	Computational Simulation of Long Bones Morphogenesis	On the Thermodynamic Formulation of Hill-Type Continuum Models for Skeletal Muscles
	Gregoire Derveaux, Dominique Chapelle	Daniel Fletcher	Luciano Teresi, Chandrajit Bajaj, Antonio DiCarlo, Samrat Goswami, Alberto Paoluzzi, Yongjie Zhang	Jose Manuel García-Aznar, Manuel Doblare, Diego A Garzón-Alvarado	J. Martins
113 - Higher Order and hp Methods with Applications to Elliptic and Maxwell Problems					
Pacific Concourse D	Fully Automatic hp-Adaptivity for Acoustic and Electromagnetic Scattering in Three Dimensions	Extensions of the 2D Automatic HP Adaptive FEM for Stokes and Non-Stationary Heat Transfer Problems	Equilibrated Residual-Based Error Estimators for Poisson and Maxwell's Equations	Stochastic a Posteriori Error Estimation for Elliptic Problems with Random Coefficients	
	Jason Kurtz, Leszek Demkowicz	Pawel Matuszyk, Maciej Paszynski	Sabine Zaglmayr, Dietrich Braess, Joachim Schoeberl	Xiaoliang Wan, George Karniadakis	
105 - Numerical Techniques for the Modeling of Failure in Solids					
Pacific Concourse E	Use of Cohesive Elements in Failure Analysis	New Finite Elements with Embedded Strong Discontinuities in the Finite Deformation Range	Embedded Discontinuity Finite Element Model for Dynamic Localization Problems	An Enrichment of Continuum Theory to Achieve Autonomous Material Separation	The Use of Distributional Body Forces to Enforce Cracks in Elastic Materials
	Joop Nagtegaal, Ted Diehl, David Fox	Francisco Armero, Christian Linder	Gustavo Ayala, Gelacio Juarez Luna	Lara Leininger, Mark Rashid	Luca Heltai, Francesco Costanzo
050 - Meshfree and Generalized/Extended Finite Element Methods					
Pacific Concourse F	Transient Interaction of Structures with Fluids and Solids	Trefftz Method for Stokes Flow	Conformal Decomposition FEM for Steady Fluids Problems	An Alpha-FEM for Linear and Non-Linear Solid Mechanics Problems	
	Youngjean Jung, J. Dolbow, Tod Laursen	Tzon-Tzer Lu, Chia-Ming Chang	David Noble	G. R. Liu	
044/048 - Multiple Scale Modeling in Spatial and/or Temporal Domains: Theoretical and Practical Aspects					
Pacific Concourse G	Keynote: Crystal Plasticity Effects of Metal/Ceramic Interface Fracture		Multiscale Modeling of Finite Deformation in Polycrystalline Materials	Finite Element Analysis Using Strain Gradient Crystal Plasticity Theory Based on Self-Energy of GNDs	Crystal Plasticity Models with Multi-Time Scaling for Cyclic Deformation of Polycrystalline Metals
	Siegfried Schmauder		David Littlewood, Antoinette Maniatty	Dai Okumura, Nobutada Ohno, Koichi Sumida	Somnath Ghosh, Sivom Manchiraju
052 - Recent Developments in Nanoscale Simulations: From Quantum to Coarse-Grained Modeling					
Pacific Concourse H	Keynote: A Canonical Nonequilibrium Multiscale Dynamics		Atomistic Formulation of A Continuum Field Theory for Atomistic Multi-element Systems	Atomistic Computation of Average Interface Stress in Crystalline Materials	
	Shaofan Li		Youping Chen, James Lee, Liming Xiong	Changwen Mi, Sukky Jun, Sung Youb Kim, Demitris Kouris	
035 - Geometric Time Integrators					
Pacific Concourse I	Stability of Asynchronous Variational Integrators	Asynchronous Multi-Domain Variational Integrators	High-Order Multi-Step Asynchronous Splitting Methods (MASM)		
	Eric Darve, William Fong, Adrian Lew	Mark Gates, Michael Heath, Karel Matous	Matthew West		

Tuesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
029 - Computational Methods in Bioengineering					
Pacific Concourse J	Molecular Biomechanics and Thermodynamics of Cell Adhesion	Quantitative Evaluation of the Intracellular Force Balance in Endothelial Cell	Poroelastic BEMs for Modeling Biphasic Mechanics of Cell-Matrix Interactions in Articular Cartilage	Cell and Nuclear Mechanics in Silico	An R-Adaptive Artificial Viscosity Method for Finite Element Analysis of Lipid Bilayer Membranes
	Muhammad Zaman	Shinji Deguchi	Mansoor Haider, Brandy Benedict, Farshid Guilak	Ashkan Vaziri, Arvind Gopinath, Mohammad Mofrad	Lin Ma, William Klug
081 - Algorithms and Implementations in Coupled Engineering Simulation					
Pacific Concourse K	A Modal Decomposition Algorithm for Explicit Transient Dynamics	Algorithm Stepsize Adaption Using PID Feedback Control	2D Fluid-Structure Simulations of Flame Spread	A Multiscale, Parallel, 3D, FEM Approach for Modeling Tall Buildings Subject to Wind Loading	
	Jason Hales, Martin Heinstein, James Overfelt, Benjamin Spencer	Andrea Valli, Graham Carey, Alvaro Coutinho	Wei Xie, Paul DesJardin	Daniel Turner, Keith Hjelmstad	
003 - Discontinuous Galerkin methods for PDEs					
Pacific Concourse L	A Discontinuous Galerkin Method for Coupled Elasto-Diffusion	Investigations into the Efficient Implementation of a DGFEM Solver for the Navier-Stokes Equations	Verification and Validation of a Discontinuous Galerkin Model for Shallow Water Flow and Transport	A Space-Time Expansion DG Scheme with Local Time-Stepping for Unsteady Calculations	The Construction of Discretely Conservative Schemes that also Globally Conserve Energy or Entropy
	Krishna Garikipati, Stefano de Miranda, Luisa Molari, Francesco Ubertini	Koen Hillewaert, Philippe Geuzaine, Bernard Paul-Emile, Jean-Francois Remacle	Ethan Kubatko, Shintaro Bunya, Clint Dawson, Joannes Westerink	Christoph Altmann, Gregor Gassner, Frieder Lörcher, Claus-Dieter Munz	Antony Jameson
114 - Multiple Scaling and Homogenization for Mechanics and Design Optimization					
Pacific Concourse M	On the Curvature and Torsion Effects in One Dimensional Waveguides	Optimal Design of Composite Structures for Strength & Stiffness: an Inverse Homogenization Approach	Control of Burgers and Euler Equations with Applications to Optimal Shape Design in Aeronautics		
	Luísa Mascarenhas	Michael Stuebner, Robert Lipton	Francisco Palacios, Antonio Baeza, Carlos Castro, Enrique Zuazua		
094 - Finite Elements for Large Strain Problems					
Pacific Concourse N	An Average Deformation Gradient Macro Element for Incompressible Finite Elastic Deformations	A Shell Element for Elasto – Plastic Finite Strain Analyzes.	A High Order Finite Volume Strategy for the Solution of non Linear Elasticity	Finite Elements with Non-Local Pressure for Modeling Nonlinear Visco-Elastic/Plastic Solids	
	Eiris Boerner, Peter Wriggers	Rita Toscano, Eduardo Dvorkin	Abdelmalek Zine, Jean-François Maitre, Ali Rezgui	Pedro Areias, Karel Matous	
077 - New Actuators and Mechanisms					
Pacific Concourse O	Thermal Analysis and Modeling for Externally Heated MEMS Thermal-Actuators	Design and Geometric Optimization of MEMS Thermal Actuators	Modeling and Simulation of MicroCantilever Beams for Sensing and Actuating Applications		
	Jorge Varona, Jesus Escobedo, Anas Hamoui, Margarita Tepocyotl	Teresa Orvañanos, Jesus Escobedo, Margarita Tepocyotl, Jorge Varona	Basavaprabhu Sheeparamatti, Mallappa Hebbal, Jagadish Kadadevaramath, Rajeshwari Sheeparamatti		

Tuesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
111 - Computational Solid Mechanics: Recent Advances					
Grand Ballroom B	Virus Nucleo-Capsids as Deformable Shells	An Improved Contact Algorithm for Multimaterial Continuum Codes	Science-Based Computation for the Engineering Problems Coupling Mechanics and Electromagnetic Load	An ALE CFD Algorithm for Fluid-Thermo-Structural Simulation of a Laser Surface Treatment Process	
	Wenqi Zhao, Chandrajit Bajaj	David Littlefield	Su Hao	AJ Baker, Charlie Lin, Joe Orzechowski	
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	Non Intrusive Stochastic Finite Elements: Application to the Embankment Dam Problem	High Order Stochastic Collocation for Turbulent Flow and Heat Transfer Around a Cylinder	Stochastic Response Surfaces by Local Chaos Expansions	Inversion of Random Field Models for Heterogeneous Media from Spectral Analysis of Mechanical Waves	Reliability of Imperfect Shells Subject to Buckling Based on the Asymptotic Numerical Method
	Bruno Sudret, Geraud Blatman	Paul Constantine, Alireza Doostan, Gianluca Iaccarino, Qiqi Wang	Carsten Proppe	Maarten Arnst, Marc Bonnet, Didier Clouteau, Quang Anh Ta	Claudine Noirfalise, Jean-Marc Bourinet, Bruno Cochelin, Michel Fogli
074 - Cohesive Models of Fracture, Branching, and Fragmentation					
Regency A	Three-Dimensional Cohesive Zone Modeling of Fracture in Asphalt Concrete	The Cohesive Continuum Framework for Analysis of Fracture in Solid Bodies	Dynamic Fracture Using Finite Elements Enhanced with Cohesive Discontinuities	J-Q Characterization of Constraint Effects of a Three-Dimensional Cracked Specimen	
	Seong Hyeok Song, William Buttlar, Glaucio Paulino	Randolph Settgast, Mark Rashid	Christian Linder, Francisco Armero	Fernando Labbe	
025 - Modeling and Computation of Active Small (Nano) Systems Issues for Small Systems					
Regency B	Non-equilibrium Statistical Mechanics: Theory and Simulations	Whole Chip Numerical Simulation of Integrated Biomolecular Microfluidic Devices (Invited).	Multiscale Simulation of Electrokinetic Transport in Nanochannels	Modeling of Prepatterned Quantum Dots	Iintrinsic Localized Modes in Lithium Tantalate Nano Ferroelectrics by Multi-Timescale Analysis
	Phil Attard	David Erickson	Sony Joseph, Narayana Aluru	Mingkun Sun, Peter Chung, Ernie Pan	Panchu Gopal Pal
063 - Pavement Mechanics and Simulation					
Plaza Room	Reflective Cracking Prediction in Asphalt Concrete Overlays: An Integrated Approach	Effect of Thermo-Mechanical Loading on the Critical Gear Positions in Rigid Pavements Analysis	Investigations of Warm Mix Asphalt Technology by the California Department of Transportation	A New Laboratory Test for Reflective Cracking in Mode I and/or Mode II	
	William Buttlar, Eshan V. Dave, Todd A. Lynn, Glaucio Paulino, Seong Hyeok Song	Francisco Evangelista Junior, Jeffery Roesler	Cathrina Barros, Huiming Yin, John Harvey	Guillaume Guissi, Guy Doré, Pierre Pascale, Daniel Peraton	
066 - Modeling and Simulation of Nano Materials and Mechanics					
Bayview A	Keynote: Strain Recovery in Nano Crystalline Thin Metal Films		Brittle and Ductile Failure Mechanisms of Semiconductor Nanowires	The Effect of Deposition Conditions on Film Stress: New Computational Questions	Atomic Simulation of Surface, Microstructure and Stress Evolution during Polycrystalline Film Growth
	Taher Saif, Jagannathan Rajagopalan		Wei Cai, Keonwook Kang	Andrea Del Vecchio	Chun-Wei Pao

Tuesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
047 - Recent Advances in Modeling of Engineering Materials/Systems					
Bayview B	Period Estimation of R/C Frame Type Buildings Using Continuum Method	Nonlinear Frame Analysis Using Blended Meshfree and Finite Elements	Finite Element Analysis of Vehicle-Bridge Interaction	Predicting the Compression Strength of Concrete Members Using PZT	
	Armagan Korkmaz, Fuat Demir	Louie L. Yaw, Sashi Kunnath, N. Sukumar	Hyung-Jo Jung, Ji-Seong Jo, Hongjin Kim	Whajung Kim, Choong-Jae Cho, Hongjin Kim, Kyung-Jae Shin	
116 - Computational Biology, Biomechanics and Biomedicine					
Seacliff A	Modeling the Effects of Periosteal Surface Loads on Spontaneous Bone Straightening in Children	Effect of Patella Resection Level on Kinematics Following Cruciate Retaining Total Knee Arthroplasty	Factors Affecting Failure of Brittle Coatings Over Compliant Substrates	Analysis of an Electrical Procedure for Disrupting Fibrous Capsule Formation Around Implants	Dynamical Finite Element Modeling of Soft Tissues as Chemo-Electric Porous Media
	Dana Carpenter, Dennis Carter	Said Gomaa, John L. Williams	Chris Ford, Mark Bush, Xiao-Zhi Hu, Tarek Qasim	Paul Ryan, Rabia Djellouli	Zhaochun Yang, Lars Gilbertson, Jeen-Shang Lin, Patrick Smolinski, Henryk Stolarski
109 - Partition of Unity Finite Element and Meshless Methods: Advances and Engineering Applications					
Seacliff B	On Techniques for Enforcing Constraints on Embedded Interfaces	None Locking Lagrangian Contact formulation with X-FEM	Narrow Band Approach to Construct Solutions Satisfying Boundary Conditions	Hybrid-Mixed and Hybrid Finite Elements with Nodal Enrichment	
	J. Dolbow	Patrick Massin, Samuel Geniaud, N. Moës	Igor Tsukanov, Vadim Shapiro	Sergio Persival Proença, Wesley Góis	
024 - Computational Formulations Involving Shell and Other Thin-Walled Structures					
Seacliff C	Advances on the New Rotation-Free Finite Element Shell Triangle Using Accurate Geometrical Data	On Optimal Nonlinear Shell Element: Formulation & C-Type FEM	Dynamic Elasto-Plastic Analysis of the Knee Brace Damper Under Cyclic Axial Loading	Degenerate shell finite element model of piezolaminated smart composites for active control	
	Pere-Andreu Ubach de Fuentes, Eugenio Oñate	Debabrata Ray	Tatsuhiko Ine, Keishi Itoh, Koichi Kajiwara, Kohei Yuge	S. Narayanan, V. Balamurugan	
Seacliff D					
017 - Non-Invasive Sensing of Subsurface Properties					
Golden Gate Room	Radiation Transport Techniques Utilized to Model Response of Subsurface Nuclear Probes	A 2.5D Coupled FE-BE Model for the Simulation of SASW Tests Along Dykes	Stochastic Soil Characterization by Means of the SASW Test for the Prediction of Ground Vibrations		
	Ahmed Badruzzaman	Geert Degrande, Thomas Fechner, Stijn François, Lutz Karl	Mattias Schevenels, Geert Degrande, Stijn François, Geert Lombaert		
053 - Computational Methods in Image Analysis					
Marina Room	Keynote: Volumetric Image and Geometry Segmentation of Human Cardiovasculature		A Human Motion Recognition Method for MonocularCamera Utilizing State Transitions in an Action-Space	Graph Cut Optimization for the Piesewise Smooth Mumford-Shah Model	
	Andrew Gillette, Chandrajit Bajaj, Samrat Goswami, Sangmin Park, Yongjie Zhang		Bai Haiying	Noha El-Zehiry, Prasanna Sahoo, Steve Xu	

Tuesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
009 - Computational Methods in Biological Growth and Remodeling					
Garden Room A	A Model Denoting the Development of the Anisotropic Elastic Stiffness of Bone Basing on Wolff's Law	The Numerical Implications of Multi-Phasic Mechanics Assumptions Underlying Growth Models	Mathematical Models and Numerical Calculations of Heat and Mass Transfer During Metabolism and Growth	Finite Element Analysis of a Crack-Initiation Test Specimen for Dental Restorative Systems	Finite Element Cellular Model for Cell Sorting and Tumor Growth
	Silke Besdo, Dieter Besdo	Harish Narayanan, Ellen Arruda, Krishna Garikipati, Karl Grosh	Dmytro Yevdokymov, Margarita Androsova, Olexandr Kochubey, Tetyana Polishko, Tetyana Smolens'ka	Sebnem Özüpek, Utku Ünlü	Yi Jiang, Shoubin Dong, Kejing He, Liqun Tang
083 - Particle Methods in Continua and Discontinua Mechanics					
Garden Room B	Pseudo Rigid Non Smooth Contact Dynamics of Dry Masonry	Mechanical Properties of Granular Media Using a Discrete, Quasi-Static Model	Analysis and Improvement of the Material Point Method for Multi-D Simulations	Modeling Interaction of Phases in Mixtures using a Multi-field Material Point Method	
	Nenad Bicanic, Tomasz Koziara	Ran Holtzman, Tadeusz Patzek, Dmitriy Silin	Michael Steffen, Martin Berzins, James Guilkey, Mike Kirby	Peter Mackenzie-Helnwein, Pedro Arduino, Gregory R. Miller, John A. Moore, Woo Kuen Shin	
096 - Models and Methods in Computational Vascular and Cardiovascular Mechanics					
Pacific Concourse A	The Role of Hemodynamics in Cerebral Aneurysms	Tuning Hemodynamic Simulations with Three-Element Windkessel Outlet Boundary Conditions	Three-Dimensional Simulations of Aortic Blood Flow and Pressure Including a Lumped Heart Model	A Multimaterial Anisotropic Mesh of the Mouse Heart Suitable for Fluid-Solid Simulations	Steady and Transient Flow Simulation of Pulmonary Artery after Arterial Switch Operation
	Juan Cebral, Rainald Lohner, Christopher Putman	Ryan Spilker, C.A. Taylor	Hyun Jin Kim, Carlos Alberto Figueroa, Kenneth E. Jansen, C.A. Taylor, Irene Vignon-Clementel	James Carson, Daniel Einstein, Andrew Kuprat	Tongdar Tang, In-Shiu Chiu
104 - Computational Techniques Related to Configurational Mechanics					
Pacific Concourse B	The Element-Free Galerkin Method in Configurational Mechanics	Mesh Optimization Techniques Based on Variational Design Sensitivity Analysis	Evolution of Inhomogeneity Forces in Polycrystalline Aggregate through Cyclic Process	Investigating Flaw Propagation in Stimulus-Responsive Hydrogels	
	Julia Mergheim, Michael Scherer, Paul Steinmann	Daniel Materna, Franz-Joseph Barthold	Shoji Imatani	Vladimir Korchagin, J. Dolbow, David Stepp	
058 - Advances in Solver Technology for Industrial Finite Element Analysis					
Pacific Concourse C	An Algorithmic Perspective on Progress in Finite Element Linear- and Eigen-Solvers	Multi-Step Block Preconditioner for Saddle Point Problems	Improvements to Domain Decomposition and Parallel Processing in MSC.Marc	The Impact of High-Performance Computing on Commercial Finite Element Analysis	GPGPU Enhanced Conjugate Gradient Solver for Finite Element Matrices
	Cleve Ashcraft, Roger Grimes, Bob Lucas	Aleksandar Jemcov, Joseph P. Maruszewski	Alois Danek, Hassan Bayoumi	Harun Bayraktar, Vladimir Belsky, Luis Crivelli, Matt Dunbar, Yuping Wang	Serban Georgescu, Hiroshi Okuda
Pacific Concourse D					

Tuesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
105 - Numerical Techniques for the Modeling of Failure in Solids					
Pacific Concourse E	Modelling Small-Scale Field Blast Tests on a Layered Rock–Soil Site	Hybrid Elastoplastic Damage and Healing Formulations for Geomaterials During Earth Moving Processes	Computational Methods for Damage Engineering	On Calibration of the Continuum-Discrete Damage Model Capable of Representing Localized Failure	Mesh-Free Simulations of Dynamic Adiabatic Shear Bands Using Physics-Based Ductile Failure Criterion
	Michael Ortiz, Cristina Jommi, Anna Pandolfi	Kuo-Yao Yuan, J. Woody Ju	Ron H.J. Peerlings, Marc G.D. Geers, Jesus Mediavilla	Anna Kucerova, Zdenek Bittnar, Delphine Brancherie, Adnan Ibrahimbegovic, Jan Zeman	Sergey Medyanik
050 - Meshfree and Generalized/Extended Finite Element Methods					
Pacific Concourse F	Fluid-Structure Interaction with Fracture	Effective and Non-Intrusive Essential Boundary Condition Imposition in Meshfree Explicit Dynamics	Modelling Brittle Fracture Using the Material Point Method	Brittle/Ductile Dynamic Fracture in 2D Plane and Shell Elements with XFEM	
	Hongwu Wang, Ted Belytschko	K. Danielson	Fan Li, Jingzhe Pan, Csaba Sinka	Jeong-Hoon Song, Ted Belytschko	
044/048 - Multiple Scale Modeling in Spatial and/or Temporal Domains: Theoretical and Practical Aspects					
Pacific Concourse G	Initial Plasticity on the Microscale with a Nonlinear FE Cosserat Formulation	Multi-Scale Simulation of Material Processing by Phase-Field & Homogenization Method	Permeability Predictions of Open-Cell Metallic Foams Via a Two-Level Homogenization Procedure	Multiscale Modeling of Alloy Solidification	
	Ingo Muench, Werner Wagner	Kazumi Matsui, Toshiyuki Koyama, Kenjiro Terada	Gottfried Laschet, Stephan Rex, Josef Scheele	Lijian Tan, Nicholas Zabaras	
052 - Recent Developments in Nanoscale Simulations: From Quantum to Coarse-Grained Modeling					
Pacific Concourse H	Multiscale Modeling of Electron-Mechnical Coupling in Single-Walled Carbon Nanotubes	Quasi-Continuum Orbital-Free Density-Functional Theory (QC-OFDFT)	Development of Weighted Many-Body Expansions Using Ab-Initio Calculations	Partition-of-Unity Finite-Element Approach for Large-Scale Quantum Mechanical Materials Calculations	Ab-Initio Computation of Crystals and Defects with FEM
	Dong Qian	Vikram Gavini, Kaushik Bhattacharya, Michael Ortiz	Veera Sundararaghavan, Nicholas Zabaras	John Pask, N. Sukumar	Ann-Lenaig Hamon, Denis Aubry
035 - Geometric Time Integrators					
Pacific Concourse I	The Variational Discrete Null Space Method in Constrained Dynamics and Optimal Control	Discrete Variational Fluids	Variational Interface Processing		
	Sigrid Leyendecker, Jerrold E. Marsden, Sina Ober-Blöbaum, Michael Ortiz	Eva Kanso, Mathieu Desbrun	Mathieu Desbrun		
029 - Computational Methods in Bioengineering					
Pacific Concourse J	Modeling of Mammalian Cell Membranes: An Exact Solution	Computational Modeling of Cancer Cell Mechanics	Structural Phase Transitions in the Protein Shells of Viruses	Development of Virtual Tools for Cardiac Ventricular Remodeling Surgery	Implementation of a Viscoelastic Arterial Wall Model for Dolving the 1-D Equations of Blood Flow
	Eveline Baesu, Sujatha Kalyanam, Marcelina Mocanu	Yeong Loong Quek, Keng Hwee Chiam, Tan Lei Lai	William Klug, Robijn Bruinsma, Lin Ma	Julius Guccione, Mark Ratcliffe, David Saloner, Nielen Stander, Kay Sun, Zhihong Zhang	Rashmi Raghu, Carlos Alberto Figueroa, C.A. Taylor, Irene Vignon-Clementel

Tuesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
081 - Algorithms and Implementations in Coupled Engineering Simulation					
Pacific Concourse K	Parallel Adaptive Multimechanics Simulations Using Diablo	Verification Strategies for Multi-Mechanics Algorithms	Adaptive Multi-Physics Simulation of Coupled Radiative and Conductive Heat Transfer		
	Dennis Parsons, Jerome Solberg, Robert Ferencz, Mark Havstad	Stefan Domino, James Overfelt, Greg Wagner	Brian Carnes, Russell Hooper		
003 - Discontinuous Galerkin methods for PDEs					
Pacific Concourse L	Towards an Ocean Model Using the Discontinuous Galerkin Method	A Discontinuous-Galerkin-Based Immersed Boundary Method	A 3D Multiscale Discontinuous Method for Evanescent Waves in Fluid and Fluid/Solid Problems.	Linear DG vs. Second-Order FVM for Incompressible Navier-Stokes	
	Bernard Paul-Emile, Vincent Legat, Jean-Francois Remacle	Adrian Lew, Gustavo Buscaglia	Paolo Massimi, Charbel Farhat, Radek Tezaur	Frank Ham	
026 - Computational Methods for Fluid-Structure Interaction					
Pacific Concourse M	Keynote: A Discussion of Recent Trends and Claims Pertaining to the Staggered Solution of FSI Problems		Solving Fluid-Structure Interaction Problems Using Strong Coupling Algorithms and the CTL	Stable and Accurate Explicit Coupling Scheme for Transient Fluid/Structure Interaction Simulations	High-Order Interpolation of Reduced-Order Models for Near Real-Time Aeroelastic Prediction
	Charbel Farhat, Thuan Lieu		Joachim Rang, Martin Krosche, Hermann G. Matthies, Rainer Niekamp	Philippe Geubelle, Rajeev Jaiman, Xiangmin Jiao, Eric Loth	David Amsallem, Charbel Farhat, Thuan Lieu
094 - Finite Elements for Large Strain Problems					
Pacific Concourse N	High-order FEM Applied to Finite Strain Hyperelasticity	Approximate Analytical Solutions for Membranes Subject to Pressure	Three-Dimensional Step-Wise Lagrangian FEM		
	Qiang Yang, Eduardo Chan, Tad Doxsee Jr., Christos Katsis	Vinicius Arcaro	Tarig Dinar, Mark Rashid, Mili Selimotic		
077 - New Actuators and Mechanisms					
Pacific Concourse O	A Survey of Factors Influencing the Location of Critical Section in Spur Gear using FEM	The Reduction of Root Fillet Stress in Spur Gear Using Circular and Elliptical Stress Relieving Feat	Comparative Study of Root Fillet Stresses with Different Rim Thickness for One, Two, Three, Five Tee		
	Vinay Math, Mallappa Hebbal, Shravankumar Kerur	Mallappa Hebbal, Vinay Math, Basavaprabhu Sheeparamatti	Shravankumar Kerur, Mallappa Hebbal, Vinay Math		

Wednesday, July 25

Technical Session 7 – Morning Session
9:45 – 11:35 am

Technical Session 8 – Afternoon Session
2:10 – 4:00 pm

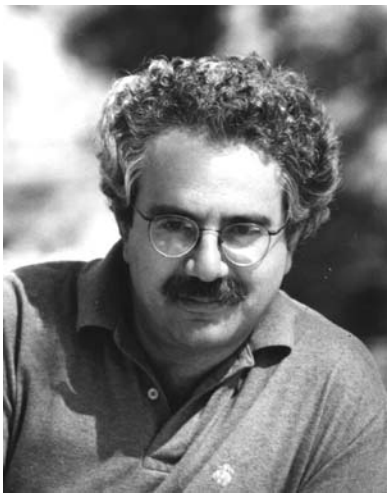
Technical Session 9 – Late Afternoon Session
4:30 – 6:20 pm

Douglas N. Arnold
University of Minnesota

Finite Element Exterior Calculus: A New Approach to the Stability of Finite Elements

Wednesday, July 25th, 8:15 – 9:15 a.m., Grand Ballroom A

The finite element method is a vastly developed technology which is surely one of the most important tools of computational mechanics. Nonetheless fundamental challenges remain in the design and understanding of finite element methods for certain important classes of problems, including in key areas like electromagnetism and elasticity. A powerful new approach--known as the finite element exterior calculus--has recently enabled substantial advances to long standing open problems such as the development of stable mixed finite elements for elasticity in two and three dimensions. The key to the new development is the achievement of stability by developing discretizations which are compatible with the geometrical and topological structures which mathematicians have developed to explore the well-posedness of the PDE problem being solved.



Yannis G. Kevrekidis
Princeton University

Equation-Free Modeling and Computation for Complex/Multiscale Systems

Wednesday, July 25th, 1:00 – 2:00 p.m., Grand Ballroom A

In current modeling practice for complex reacting systems, the best available descriptions often come at a fine level (atomistic, stochastic, microscopic, individual-based) while the questions asked and the tasks required by the modeler (prediction, parametric analysis, optimization and control) are at a much coarser, averaged, macroscopic level. Traditional modeling approaches start by first deriving macroscopic evolution equations from the microscopic models, and then bringing our arsenal of mathematical and algorithmic tools to bear on these macroscopic descriptions. Over the last few years, and with several collaborators, we have developed and validated a mathematically inspired, computational enabling technology that allows the modeler to perform macroscopic tasks acting on the microscopic models directly. We call this the ``equation-free" approach, since it circumvents the step of obtaining accurate macroscopic descriptions. We will argue that the backbone of this approach is the design of (computational) experiments. Traditional continuum numerical algorithms can thus viewed as protocols for experimental design (where experiment means a computational experiment set up and performed with a model at a different level of description). Ultimately, what makes it all possible is the ability to initialize computational experiments at will. Short bursts of appropriately initialized computational experimentation through matrix-free numerical analysis and systems theory tools like variance reduction and estimation- bridges microscopic simulation with macroscopic modeling. I will also discuss some recent developments in data mining algorithms, exploring large complex data sets to find good "reduction coordinates".

Wednesday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
111 - Computational Solid Mechanics: Recent Advances					
Grand Ballroom B	Multiresolution Finite Element Theory for Hierarchical Materials with Interactive Scales	A Multiscale Design System Based Reduced Order Homogenization	SGBEM Assessment of the Fatugye Life of Particulate Composites	Multiscale Damage Analysis of Bending Beam Using Layerwise Theory	Simulation of the Micromechanics of Localized Damage and Fracture in Solids at High Speed Impacts
	Franck Vernerey, Wing Kam Liu, Cahal McVeigh	Zheng Yuan, Jacob Fish, Wei Wu	Anh-Vu Phan, Len Gray, Ted Kaplan, Hareesh Tippur	Wookjin Na, J. N. Reddy	George Z. Voyiadjis, Rashid K. Abu Al-Rub
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	Keynote: Uncertainty Analysis of Large Structural Systems		Nonparametric Stochastic Modeling of Structural Dynamic Systems with Uncertain Boundary Conditions	Efficient Analysis of Stochastic Systems in the Presence of Discontinuity	Ensemble Uncertainty Quantification
	Gerhart Schueller		Marc Mignolet, Christian Soize	Alireza Doostan, Tonkid Chantrasmi, Gianluca Iaccarino	Steve Wojtkiewicz
051 - Mathematical and Computational Aspects of Multi-scale and Multi-physics					
Regency A	Keynote: Adaptive Sampling in Multi-scale Simulations		Multi-Scale Coupled Analysis Based on Polycrystalline Homogenization Method	Derivation of Continuum Strain Energy Density of a Polymer Lattice with Central Pair Potentials	Coupling of Atomistic and Continuum Descriptions of Liquids
	Jaroslaw Knap, Athanasios Arsenlis, Nathan R. Barton, Richard Becker, Richard D. Hornung, David R. Jefferson		Yuichi Tadano, Mitsutoshi Kuroda, H. Noguchi	Chetan Jhurani, Leszek Demkowicz	Petros Koumoutsakos
049 - Computational Dynamics					
Regency B	Conserving Time Operators within the Framework of LMS Methods for Computational Structural Dynamics	Consistent Integrators for Large Strain Elastoplasto-Dynamics Relying on Finite Elements in Time	The d'Alembert-Lagrange Principal Equations and Applications to Floating Flexible Systems	Extended State-Space Time Integration for High-Frequency Dissipation	Controllable Numerical Dissipation using Singly Diagonal Implicit Runge-Kutta (SDIRK) Methods
	Kumar Tamma, Andrew Hoitink, Siti Masuri, Xiangmin Zhou	Rouven Mohr, Andreas Menzel, Paul Steinmann	K.-C. Park, Carlos A. Felippa, Roger Ohayon	Steen Krenk	Greg Hulbert
013 - Numerical Modelling of Contact Problems in Dynamics					
Plaza Room	A Friction Model Based on Fractal Surface Roughness	1D Thermomechanical Sub-Grid Model for Dry Friction	Dynamic Thermo-Mechanical Modeling for Multi-Contact Systems	Numerical Analysis of a Dynamic Piezoelectric Contact Problem Arising in Viscoelasticity	
	Kai Willner	Franck Dambakizi	Cogne Claudia, Bellanger Emmanuel, Mohamed Guessasma, Jerome Fortin, Nguyen Viet	Jose R. Fernandez, Mikael Barboteu, Raffat Tarraf	
066 - Modeling and Simulation of Nano Materials and Mechanics					
Bayview A	Keynote: Effect of Surface Stress on the Mechanics of Thin Films and Nanoscale Materials		Growth Kinetics of Si and Ge Nanowires	Finite Deformation is the Pillar of Ordered Buckling in Thin Films	Molecular Dynamics Simulations of Stress Generation During Thin Film Growth: Continual Coalescence
	Robert Cammarata		Suneel Kodambaka, James Hannon, Mark Reuter, Frances Ross, Jerry Tersoff, Rudolf Tromp	Hanqing Jiang	Steve Seel

Wednesday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
047 - Recent Advances in Modeling of Engineering Materials/Systems					
Bayview B	Keynote: Prediction of Structural Performance of Shear-Deficient RC Beams		Nonlinear Model of Reinforced Concrete Frames Retrofitted by HPFRCC Infill-Panel	Prediction of Failure State in Continuum Structures Using the Successive Zooming Genetic Algorithm	Numerical Modeling for Cyclic Behavior of Fiber Reinforced Cementitious Composites
	H.K. Lee, Muhammad Afzal, Sung Kook Ha		Chang-Geun Cho, Gee Joo Ha, Yun Yong Kim	Sim-Dong Yeo, Young-Doo Kwon, Hyun-Wook Kwon	Kyung-Joon Shin, Sung-Pil Chang, Kwang-Myong Lee
008 - Multiscale Damage and Failure Mechanics					
Seacliff A	Keynote: Elastoplastic Micromechanical Damage Mechanics for Composites with Partial Fiber Debonding		Micromechanical Modeling of Debonding in Inclusion-Reinforced Composites: Homogenization and FEA	Multiscale Failure Analysis of Composite Shells subjected to Dynamic Loads	Local Pattern Recognitions and Classification in the Linear Elastic Deformation of Two-dimensional P
	Keiji Yanase, J. Woody Ju		Issam Doghri	Caglar Oskay, Ghanshyam Pal	Sanjay Arwade, Libin Tan
097 - Biofluids and Coupled Problems in Biomechanics					
Seacliff B	Keynote: Blood Flow in Compliant Vascular Models: Biomechanics of an Enlarging Intracranial Aneurysm		FSI Modeling of Blood Flow and Cerebral Aneurysm: Significance of Arterial and Aneurysm Shape	Computational Modeling of Pulmonary Alveoli	Computational Fluid Dynamics Predictions of Environmental Exposure
	Carlos Alberto Figueroa, S. Baek, J. D. Humphrey, C.A. Taylor		Ryo Torii, Toshio Kobayashi, Marie Oshima, Kiyoshi Takagi, Tayfun Tezduyar	Lena Wiechert, Wolfgang A. Wall	Daniel Einstein
099 - Finite Element Methods in Environmental Fluid Mechanics					
Seacliff C	Keynote: Numerical Techniques in a Parallel, Unstructured-Grid, Finite-Volume Coastal Ocean Simulation Tool		Modeling Hurricane Storm Surge along the Gulf Coast - Towards Petaflop Computations	Fast Sweeping Methods with a Discontinuous Galerkin Local Solver for Eikonal Equations	Modeling the Coupled Winds, Waves, and Storm Surge of Hurricane Rita
	Oliver Fringer, Margot Gerritsen, Bing Wang		Joannes Westerink, John Atkiinson, Shintaro Bunya, Clint Dawson, Joel Dietrich, Ethan Kubatko, Rick Luettich, Hans Westerink	Yong-Tao Zhang, Fengyan Li, Chi-Wang Shu, Hong-Kai Zhao	Joel Dietrich, Joannes Westerink
067 - Asymptotic and Numerical Approaches to Electron and Phonon Transport in Nanowires					
Seacliff D	Scattering in Nonhomogeneous Waveguides	Control of the Low Temperature Thermal Conductance of Corrugated	Asymptotic Description of Electron Transport in Waveguides with Several Narrows	Electron Transport in a Locally Quasi-Periodical Waveguide	Thermal Transport in Silicon microsystems
	Boris Plamenevsky	Lev Baskin, Boris Plamenevsky, Alexey Pozharskii	Oleg Sarafanov	Alexey Pozharskiy	Sylvie Aubry, Chris Kimmer, Patrick Schelling, Ashton Skye
010/057 - Accomplishments and Challenges in Verification and Validation					
Golden Gate Room	Verification and Adaptivity in Sandia's SIERRA Mechanics Codes	Calculation Verification in Finite Deformation Applications Using hHgher-Order Methods	Verification and Validation of Premixed Laminar Flames	V&V of a Multi-Physics Code for Induction Heating	
	Kevin Copps, Brian Carnes, Derek Gaston, Christopher Newman	Stefan Hartmann, Alexander Duester, Uli Heisserer, Karsten Quint, Zohar Yosibash	Joseph Powers, Ashraf Al-Khateeb, Samual Paolucci	Kin Lam	

Wednesday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
053 - Computational Methods in Image Analysis					
Marina Room	Automatic 3D Reconstruction and FE-Mesh Generation of Bifurcating Vascular Regions	Tracking Features with Kalman Filtering, Mahalanobis Distance and a Management Model	Quadrilateral Progressive Compression Method for Meshes		
	Martin Auer, T. Christian Gasser	Raquel Pinho, Miguel Correia, Joao Manuel R. Tavares	Ren Chen, Yuchao Lin, Xiaonan Luo		
106 - Multiscale Modeling of Materials					
Garden Room A	Keynote: Gradient and Fracture Energy-Based Plasticity Theory for Quasi-Brittle Materials like Concrete		Anisotropy During Monotonic and Multi Stage Loading in BCC Structured Metals	Multiscale Homogenization of Discontinuous Media	Numerical Modelling of Fracture and Fatigue Damage in Human Arteries
	Guillermo Etse, Sonia Vrech		Tuncay Yalcinkaya, W.A.M. Brekelmans, M.G.D. Geers	Holger Meier, Ellen Kuhl, Paul Steinmann	Anna Pandolfi, Anna Ferrara
108 - Large Scale and Distributed Computing: Application Development Towards Petascale Platforms					
Garden Room B	Petascale Applications -- Special Needs and Challenges	Current and Future High-End Computing Applications at NASA	Prospects for Earthquake Inversion on Petaflops Systems	Spectral/HP Element Simulation of the Human Arterial Tree on the TeraGrid.	Next Steps in Supporting Parallel Adaptive Simulations
	Abani Patra	Rupak Biswas	Omar Ghattas	Leopold Grinberg, George Karniadakis	Mark Shephard, Benjamin FrantzDale, Kenneth Jansen, Xiaojuan Luo, Mohan Nuggehally, Onkar Sahni, Ting Xie
019 - Computational Biomechanics: From Biomolecules to Organisms					
Pacific Concourse A	Comparing Aggregation Mechanism and Morphologies between Disease and Non-Disease Proteins	A Microstructurally Informed Model for the Three-Dimensional Mechanical Response of Actin Networks	Fragment-Based Replica-Exchange Simulation of Peptides in an Explicit Solvent	From Micro to Macro: Explaining the Mechanical Behavior of Fibrous Tissues through their Structure	Micropost Force Sensor Array (MFSA) Modeling and Biological Applications
	Teresa Head-Gordon, Nicolas Lux Fawzi, Jonathan Kohn, Enghui Yap	Ronald Kwon, Christopher Jacobs, Adrian Lew	Masaaki Suzuki, Hiroshi Okuda	Fernando Cacho, Heinz Amenitsch, Gerhard A. Holzapfel, Peter Laggner, Fabian Schmid	Michael Lin, James Wang
033 - Computational Mechanics of Random Media					
Pacific Concourse B	Keynote: Sensitivity and Randomness in Homogenization of Periodic Composites Via the Response Function Method		Reconstruction of Periodic Unit Cells of Multimodal Particulate Composites using Genetic Algorithms	Multiscale Stochastic Finite Element Analysis of Elastic Random Composites	Elastodynamic Wave Scattering by Finite-Sized Resonant Scatterers
	Marcin Kaminski		Karel Matous, Natarajan Chennimalai Kumar, Brett Collins, Philippe Geubelle	X. Frank Xu	Geert Lombaert, Didier Clouteau
089 - Nanoscale Modeling and Simulation in Mechanics of Materials					
Pacific Concourse C	Keynote: Plastic Deformation and Shape Memory Effect of Carbon Nanotubes		Multiscale Modeling and Simulation of Nano Imprinting Lithography	Effects of Hydrogen Atom on Dislocation Mobility in Alpha Iron	Finite Displacement Behaviors of 2D Open-Framework Structures Connected by Flexible Joints
	Shigenobu Ogata, Seiji Akita, Ju Li, Hideki Mori, Yoshikazu Nakayama		Sungjin Kwon, Youn Young Earmme, Seyoung Im, Jiwon Kang, Sung Youb Kim, Yoon Sup Lee, Youngmin Lee	Shinya Taketomi, Ryosuke Matsumoto, Noriyuki Miyazaki	Hiro Tanaka, Yoji Shibutani

Wednesday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
006 - Symposium on Multiscale Methods and Applications to Nano- and Bio- Mechanics and Materials					
Pacific Concourse D	Keynote: Multiresolution Probabilistic Finite Element Method: Validation to Prediction		Surface Stress Effects on the Resonant Properties of Metal Nanowires	Coupling Atoms to Continuum for Dynamic Crack Propagation	Multiscale Design of Multifunctional Heterogeneous Materials for Energy-Generating Devices
	Wing Kam Liu, Ji Hoon Kim, Cahal McVeigh, Franck Vernerey		Harold Park, Patrick Klein	Pascal Aubertin, René De Borst, Julien Rethore	Ji Hoon Kim, Wing Kam Liu
105 - Numerical Techniques for the Modeling of Failure in Solids					
Pacific Concourse E	Three-Dimensional Non-Planar Crack Growth by a Coupled Extended Finite Element/Fast Marching Method	Robust Extraction of the Stress Intensity Factors for 3D Cracks in the Context of X-FEM.	On Tracking Strategies for the Simulation of 3D Crack Propagation	The Variational Formulation of Fracture: Numerical Implementation	Mixed Finite Element Approximations for the Material Failure Process with Continuous Damage
	N. Sukumar, David Chopp, N. Moës	Nicolas Chevaugeon, Hans Minnebo, N. Moës	Philippe Jäger, Ellen Kuhl, Paul Steinmann	Blaise Bourdin	Gelacio Juarez Luna, Gustavo Ayala, Javier Oliver
050 - Meshfree and Generalized/Extended Finite Element Methods					
Pacific Concourse F	Basis Functions for Meshless Methods, and Comparison of Solutions with Strong and Weak Formulations	MLS Finite Difference Method for the Interfacial Singularity in Heterogeneous Materials	An Adaptive B-spline Wavelet Galerkin Method for the Elastostatic Problems	Implicit Boundary Method for Analysis using Non-Conforming Mesh	Reproducibility for the Material Point Method
	R. Batra, GangMing Zhang	Young-Cheol Yoon, Dong-Jo Kim, Hyo-Jin Kim, Sang-Ho Lee	Satoyuki Tanaka, Hiroshi Okada	Ashok V Kumar, Ravi Burla	Philip Wallstedt
044/048 - Multiple Scale Modeling in Spatial and/or Temporal Domains: Theoretical and Practical Aspects					
Pacific Concourse G	Formulation and Algorithm for Nonlinear Multiscale Problem of Solid Based on Block Newton Method	A Multiscale Octree Partition of Unity Method	Multiscale Modeling of Locally Non-Periodic Heterogeneous Materials Using MLS Variable-Node Element	Adaptive Refinement and Multiscale Modeling with Peridynamics	Multiscale Analysis for Prediction of Macroscopic Strength Dominated by Propagating Micro-Cracks
	Takahiro Yamada, Kazumi Matsui	Michael Macri, Suvranu De	Jae Hyuk Lim, Seyoung Im	Florin Bobaru, Leonardo Alves, Abe Askari, Stewart Silling, Mijia Yang	Tateki Ishii, Takashi Kyoya, Kenjiro Terada
052 - Recent Developments in Nanoscale Simulations: From Quantum to Coarse-Grained Modeling					
Pacific Concourse H	Transition Path and Path Ensemble Optimization with Gradient-Augmented Harmonic Fourier Beads Method	Theoretical Investigation of Cooperative Hydrogen Bonding Networks in Native Crystalline Celluloses	An Atomic Interaction based Continuum Model for Computational Nanoscale Contact Mechanics	Pattern Recognition and Classification in the Linear Elastic Deformation of Two-Dimensional Polycrys	Action-Based Transition Pathway Modeling of Nanomaterials
	Ilja Khavrutskii, J. Andrew McCammon	Xianghong Qian	Roger Sauer	Libin Tan, Sanjay Arwade	Sukky Jun, Sung Youb Kim, In-Ho Lee, Srinivas Pendurti
032 - Inverse Problems					
Pacific Concourse I	Keynote: Data Assimilation: Finding Initial Conditions and Parameters from Measurements		Impact of Evolved HSV and TESV Singular Vectors for Adaptive Observations Targeting in 4-D VAR Data Assimilation	The Optimal Placement of Sensors to Recover the Source of a Chem/Bio Attack	Optimal Control of Temperature in Fluid Flow
	Eric Kostelich		Ionel M Navon	Paul Boggs, Kevin Long, Stephen Margolis	Daisuke Yamazaki, Mutsuto Kawahara

Wednesday - Morning Session					
Room	**9:45**	**10:07**	**10:29**	**10:51**	**11:13**
004 - Computational Geomechanics Minisymposium					
Pacific Concourse J	Strong Discontinuity, Contact Mechanics, and XFEM for Shearing on Curved Frictional Faults	Finite Element Model of Faulting, Folding, and Fracturing of Rocks with FrictionalCcontact Mechanics	Incremental Time Stepping for Path-Dependent Frictional Crack Propagation Problem with XFEM	Three-Dimensional Discrete Element Modeling of Granular Materials	A Quasicontinuum Approach for the Simulation of the Compaction of Confined Granular Systems
	Ronaldo Borja	Pablo Sanz, Ronaldo Borja, David Pollard	Fushen Liu, Ronaldo Borja	Beichuan Yan, Richard Regueir, Stein Sture	Athanas Koynov, Alberto Cuitino
031 - Computational Methods for Micro and Nano Systems					
Pacific Concourse K	Keynote: Tensile Testing of Collagen Fibril using a MEMS Platform		Modeling Electrostatically Actuated MEMS	Finite Element Discretizations to Evaluate Electrostatic Forces Around Corners	A Homogenization-Based Lagragian MD Scheme for the Stress-Deformation Behavior of Nanoscale Systems
	Roberto Ballarini		Davide Spinello, R. Batra, Maurizio Porfiri	Stephan Hannot, Daniel Rixen, Véronique Rochus	Francesco Costanzo, Gary L. Gray
101 - Computational Mechanics of Masonry Structures					
Pacific Concourse L	Keynote: Computational Issues in Modeling Existing Masonry Structures		Failure Analysis of Masonry Arches Strengthened with FRP Reinforcements	Analysis of Masonry Panels Strengthened with FRP	Development of a Finite Element Model to Simulate Near-Surface Mounted FRP Strengthened URM Walls
	Luigi Gambarotta		Andrea Caporale, Raimondo Luciano	Elio Sacco, Ernesto Grande, Maura Imbimbo	Rudolf Seracino, Mark Masia, Robert Petersen
026 - Computational Methods for Fluid-Structure Interaction					
Pacific Concourse M	Keynote: Fluid-Structure, Valves and Multibody Contacts		Flow Past an Oscillating Cylinder Beneath a Free Surface	Passive Self-Twisting Composite Propellers	Numerical Analysis of Self-Twisting Composite Propellers
	Jean Frederic Gerbeau, Nuno Diniz dos Santos, Olivier Pantz		Serpil Kocabiyik, Oleg I. Gubanov, Larisa A. Mironova	Zhanke Liu, Mateusz Plucinski, Yin Lu Young	Yin Lu Young, Zhanke Liu
065 - Advances in Boundary Element Methods					
Pacific Concourse N	Keynote: Symmetric Galerkin BEM with the Convolution Quadrature Method for Visco- and Elastodynamics		Linear Viscoelastic Analysis of a Semi-Infinite Porous Medium	Multiple Circular Nano-Inhomogeneities in One of Two Joined Isotropic Elastic Half-Planes	An Application of Time Domain Fast Multipole BIEM to Non-Destructive Evaluation
	Martin Schanz, Lars Kielhorn		Andrey Pyatigorets, Mihai Marasteanu, Sofia G. Mogilevskaya	Matthieu Jammes, Steven L. Crouch, Sofia G. Mogilevskaya	Hitoshi Yoshikawa, Yoshihiro Otani, Naoshi Nishimura
061 - Trends in Unstructured Mesh Generation					
Pacific Concourse O	Direct CAD Access for Design Through Analysis	Constructing A Geometric Boundary Representation From Multi-Material Voxel Data	Geometry Based Parallel Mesh Generation	An Immersive Topology Environment for Generalized Hex and Tet Meshing of CAD Models	
	Robert Haimes	Tathagata Ray, Ken Greiner, Mark Shephard	Joe Walsh	Steven Owen, Brett Clark	

Wednesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
111 - Computational Solid Mechanics: Recent Advances					
Grand Ballroom B	Applications of Computational Mechanics in MEMS and NEMS	Nano Mechanics and Multi-Scale, Multi-Phenomena Problems	Elastic Properties and Mechanical Behavior Simulations of MEMS Thin Films	Finite Elements and Green's Functions	The Use of Discretized Cauchy Integrals for Finite Elements
	Subrata Mukherjee	Ken Chong	Han Sung Kim, Jaehwan Choi, J. K Lee	Friedel Hartmann	Reinhard Piltner, Lixin Li
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	Inverse Problem Using Experiments for Uncertain Fluid-Solid Multilayer Systems in Ultrasonic Domain	Uncertainty Modeling for Sound-Insulation Layers in Vibroacoustic Systems	A Nonlinear Dimension Reduction Strategy for Generating Data Driven Input Models	The Role of the Design Point for Calculating Failure Probabilities of Non Linear Structures	Efficient Software for Spectral Uncertainty Analysis in PDE-Based Models
	Christophe Desceliers, Quentin Grimal, Guillaume Haiat, Salah Naili, Christian Soize	Charles Fernandez, Laurent Gagliardini, Christian Soize	Baskar Ganapathysubramanian, Nicholas Zabaras	Marcos Valdebenito, Helmut Pradlwarter, Gerhart Schueller	Kevin Long, Roger Ghanem, George Saad
051 - Mathematical and Computational Aspects of Multi-scale and Multi-physics					
Regency A	Enriched Voronoi Cell Finite Element Model for Ductile Fracture in Particle Reinforced Metal Matrix	From PGEM to Stabilized Finite Element Methods: the Generalized Stokes Problem	Surface Roughening Mechanisms for Tungsten Exposed to Laser, Ion, and X-ray Pulses	Two-Scale Rational Approximation for Microstructured Media	Multi-scale Multi-level Coarse Graining Approach for DNA Molecules
	Chao Hu, Somnath Ghosh	Gabriel R. Barrenechea, Rodolfo Araya, Frederic Valentin	Michael Andersen, Nasr M. Ghoniem, Akiyuki Takahashi	Elena Cherkaev, Dali Zhang	Hailong Teng, J. S. Chen
049 - Computational Dynamics					
Regency B	Exact Dynamic Solutions of Frame Structures	A Computational Mechanics Based DOE Method for Vehicle Crash Simulation	Rotordynamic Analysis Using MD Nastran		
	Haitao Ma	Fubang Wu, Nripen Saha	Shawn Shamsian, Hassan Bayoumi		
013 - Numerical Modelling of Contact Problems in Dynamics					
Plaza Room	Stabilized Treatment of Contact Mechanics on Arbitrarily Oriented Interfaces Using Nitsche's Method	Stable and Energy Conserving Time Integration Schemes for Contact Problems	Non-Smooth Decomposition Methods for Strongly Local Non-Linearities	A Numerical Scheme in Primitive Variables for Thermal Incompressible Flows in Porous Media	Numerical Simulation of Propagation of Solitary Deformation Waves in Microstructured Solids
	Jessica Sanders, Tod Laursen, J. Dolbow	Barbara Wohlmuth, Corinna Hager	Rolf Krause	Elsa Baez, Alfredo Nicolas	Andrus Salupere, Jüri Engelbrecht, Kert Tamm
066 - Modeling and Simulation of Nano Materials and Mechanics					
Bayview A	Keynote: Computational Solid Mechanics Approaches for the Development of Protective Systems for the Army		NanoSE - A Computational Environment for Simulation of Micro/Nano-Devices	Multiscale Modeling and Simulation using Bridging Domain Method	Mechano-Chemical Stability of Gold Nanoparticles Coated with Alkanethiolate Self-Assembled Monolayer
	Bruce LaMattina		Roland Krause, Bruce Carter	Akhilesh Jha, Terrisa Duenas, Wenyi Hou, Shaoping Xiao	Brian Henz
047 - Recent Advances in Modeling of Engineering Materials/Systems					
Bayview B	Structural Health Monitoring using PZT Sensor for Carne Girder	System Identification of a Building Structure Using PZT Type Sensors	Development of the Functional Concrete Using LED and Sensor Technology	Damage Identification of Concrete Structure using PZT sensors	
	Chan-Woo Jung, Wha-Jung Kim, Kyung-Jae Shin	Hongjin Kim, Boung-Yong Kim, Whajung Kim	Le-Sung Kim, Whajung Kim	Dong-Eun Lee, Dae-Min Kim, Hongjin Kim, Whajung Kim	

Wednesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
008 - Multiscale Damage and Failure Mechanics					
Seacliff A	A Consistent Damage-Plasticity Model for Failure Prediction of Metallic Structures.	Multi-Scale Modeling of Porous Metal Plasticity	Atomistic Simulation of Nanoindentation Induced Deformation and Dislocation Mechanisms	Development of a Damage Mechanics Framework for Solder Joint Reliability in Electronic Packages	
	Olivier Allix, Germain Court	Alejandro Mota, Jaime Marian, Michael Ortiz	C. S. David Chen, C. W. Huang, J. W. Lai	Deepak Kulkarni, Shankar Ganapathysubramanian, Sandeep Sane	
097 - Biofluids and Coupled Problems in Biomechanics					
Seacliff B	Modeling, Simulation and Optimization for Implantable Blood Pump Design	Fluid-Solid Interactions in Heart Valve Operation - Multi-Scale and Multimaterial Simulations	Numerical Studies of Blood Flows in Healthy, Stenosed and Stented Carotid Arteries	A Simulation Model for Microcirculatory Mechanics	
	Marek Behr, Mehdi Behbahani, Mike Nicolai, Markus Probst	H. S. Udaykumar, Thakir Almomani, Sreedevi Krishnan, Sarah Vigmostad	Lucy Zhang, Mickael Gay	Jonathan Freund, Amir Isfahani, Hong Zhao	
099 - Finite Element Methods in Environmental Fluid Mechanics					
Seacliff C	Coastal and Estuarine Unstructured Meshing Via Nonlinear Velocities and Bottom Stress with Coriolis	Non-Oscillatory Hierarchical Reconstruction for DG Methods on Unstructured Meshes	Validation of a Moving Boundary RKDG Method for the Shallow Water Equa	Stabilized Finite Element Method for Shallow Water Flows	Space-Time FEM for Shallow Water Flows with Moving Boundary Using Mesh Re-Generation Method
	Scott Hagen, D. Michael Parrish	Zhiliang Xu, Yingjie Liu	Shintaro Bunya, Clint Dawson, Ethan Kubatko, Joannes Westerink, Shinobu Yoshimura	Kazuo Kashiyama, Nobuyoshi Kawai, Seizo Tanaka, Tayfun Tezduyar	Shinsuke Takase, Kazuo Kashiyama, Seizo Tanaka
073 - Structural Stability					
Seacliff D	Stability Analysis by Rigid Body Considerations	Elephant–Foot Type Buckling of Liquid–Filled Conical Shells	Out of Plane Buckling of Angled Frames with Warping Effect	Nonlinear Analysis of Time-Dependent Instability	
	Yeong-Bin Yang	Werner Guggenberger	J.D. Yau, S.R. Kuo	Aleksandra Vinogradov	
010/057 - Accomplishments and Challenges in Verification and Validation					
Golden Gate Room	Analysis of a Large Dataset for the Verification of a Hydro-dynamics Code	Dynamic Loading of LIGA Structures: Experiments and Simulations	An Incrementally Objective Co-rotational Shell Element for Explicit Transient Dynamics	Computer Modeling of Hollow Metal Door in Shock Tube Testing	Rigorous Verification Procedure for an Incompressible Navier-Stokes Solver
	Marine Marcilhac, Francois Hemez	Wayne Chen, W. Y. Lu, Bo Song	Vicki Porter, Arne Gullerud, Martin Heinstein	Wenqing Hu, Raymond Bennett, Michael Lowak, James Wesevich	Gianluca Iaccarino, Frank Ham
120 - The k-Version of the Finite Element Method and h-p-k Adaptive Processes					
Marina Room	Keynote: A New Mathematical and Computational Framework for BVP and IVP		A Priori Error Estimation for hpk FE Analyses	Computations of Viscous Compressible Flows in h, p, k Framework	Robustness of a Spline Element Method with Constraints
	Karan Surana, J. N. Reddy, Albert Romkes		Albert Romkes, J. N. Reddy, Tyler Stone, Karan Surana	Srikanth Allu, J. N. Reddy, Karan Surana	Gerard Awanou
106 - Multiscale Modeling of Materials					
Garden Room A	Mapping Damage and Plasticity for Different Constitutive Models for Simulation of the Process Chain	Micro- and Macro-Mechanical Simulation of Transformation-Induced Plasticity in Multiphase Steels	Multiscale Computational Homogenization for Heterogeneous Thin Sheets	An Adaptive Fatigue Life Prediction Model Based on Reduced Order Homogenization	
	Thomas Muenz, Markus Feucht, Andre Haufe, Karl Schweizerhof	Denny Tjahjanto, Akke Suiker, Sergio Turteltaub	Erica Coenen, Marc G.D. Geers, Varvara Kouznetsova	Erez Gal, Jacob Fish, Wei Wu, Zheng Yuan	

Wednesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
108 - Large Scale and Distributed Computing: Application Development Towards Petascale Platforms					
Garden Room B	Lazy Evaluation for Automatic Parallelisation and Pertinent Use of Deep Memory Hierarchies	Optimization of HEC-MW for SR11000	Grid-Enabled Optimal Design of High-fidelity Satellite Bus System Considering Vibration Analysis	Hybrid Direct-Iterative Linear Solution Method for Large Scale Structural Analysis Problems	Feasibility Study of GMRES(m) Method for Large Linear Systems on Distributed Resources
	Hugo Leclerc	Satoshi Ito, Hiroshi Okuda	JongKeun Moon, Jin Hee Kim, Seung Jo Kim, Young Ha Yoon	Minki Kim, Seung Jo Kim	Hiroshi Okuda, Masae Muraoka
019 - Computational Biomechanics: From Biomolecules to Organisms					
Pacific Concourse A	Analyzing Whole-Cell Viscoelastic Properties Measured with AFM	Single Cell Mechanics Study of Human Diseases	A Numerical Study of a Lamellipodial Fragment Crawling	Common Biophysical Principles Determine Cell and Tissue Shape	Modeling Flow Sensing, Transmission, and Transduction in Vascular Endothelial Cells
	Kevin Costa	C.T. Lim	Yasuhiro Inoue, Taiji Adachi	Ilka Bischofs, Martin Bastmeyer, Franziska Klein, Dirk Lehnert, Ulrich Schwarz	Abdul Barakat, Bori Mazzag
033 - Computational Mechanics of Random Media					
Pacific Concourse B	Computational Evaluation of Random Masonry Yield Surface	Finite Element and Local Methods for Effective Conductivity	Stability of Granular Media with Random Porosities	Effects of Strut Cross-Sectional Area Variations on Impact Behaviour of Open-Cell Metallic Foams	Stochastic Analysis of Composites Considering Uncertainty in Geometry and Material of Microstructure
	Federico Cluni, Nicola Cavalagli, Vittorio Gusella	Katerina Papoulia, Mircea Grigoriu, Yeranuhi Hakobyan	Jose Andrade, Jack Baker	Matej Borovinsek, Zoran Ren	Sei-ichiro Sakata, Fumihiro Ashida, Tomoyuki Kojima, Masaru Zako
089 - Nanoscale Modeling and Simulation in Mechanics of Materials					
Pacific Concourse C	Dislocation Interaction with Obstacles in FCC Metals: Atomistic to Dislocation Dynamics Approach	Molecular Dynamics Modeling of Interaction between Defect Clusters and Displacement Cascade in Zr	Elasticity Analysis of Stress Field Near Dislocation in Inhomogeneous Material		
	Hyon-Jee Lee, Jaime Marian, Enrique Martinez, Brian Wirth	Masahiro Arita, Masanori Kikuchi, Akiyuki Takahashi	Akihiro Nakatani, Yutaro Mukudai		
006 - Symposium on Multiscale Methods and Applications to Nano- and Bio- Mechanics and Materials					
Pacific Concourse D	Multi-Scale Constitutive Model for Soft Tissue: From Fibril Nanostructure to Tissue Continuum.	Electrokinetic Assembly and Manipulation of Bio-Nanomaterials	Fracture Strength Assessment and Aging Signs Detection in Human Cortical Bone Using an X-FEM Multipl	Adaptive Multiscale Modeling of Polymers with Arlequin Coupling	Analysis of the Multiscale Micromorphic Continuum Theory by Chains of Springs-and-Frictional Devices
	Brian Moran, Markus Buehler, Huang Tang	Yaling Liu, Jae-Hyun Chung, Wing Kam Liu	Elisa Budyn, Thierry Hoc	Paul Bauman, Jon Bass, J. Tinsley Oden, Serge Prudhomme	Albert To, Wing Kam Liu, Franck Vernerey
105 - Numerical Techniques for the Modeling of Failure in Solids					
Pacific Concourse E	Strong Discontinuities in Coupled Multiphase Poro-Plastic Media	3D Higher Order X-FEM Model for Hygro-Mechanical Crack Propagation Analyses	Thermo-Mechanical Modelling of Ductile Crack Propagation with Application to High Velocity Cutting	Full Scale Nonlinear Burst Simulation of Pipeline Containing High-pressure Natural Gas	Numerical Study of the Crack Growth in Typical Fuselage Structure
	Carlo Callari, Andrea Abati, Francisco Armero	Stefan Jox, Christian Becker, Günther Meschke	Martin Fagerström, Ragnar Larsson	Shinobu Yoshimura, Hiroshi Akiba, Masaki Ino, Hiroyuki Makino	Ayari Fayza, Lazghab Tarek

Wednesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
078 - Intelligent Computing in Mechanics					
Pacific Concourse F	Neural Network Stabilized Finite Elements	Applications of Artificial Immune Systems in Shape Optimization	A Novel Adaptive Technique for Intelligent Aircraft Control	Sparse Grid, a New Approach for Adaptive Meta Models	An Evolutionary Robust Optimization Method for the Wing Drag/RCS Reduction with Uncertain Operat
	Carlo L. Bottasso, Fabio Luraghi	Tadeusz Burczynski, Waclaw Kus	Nilesh Kulkarni, John Kaneshige, Kalmanje Krishnakumar	Mohamed Masmoudi, Thierry Touya	Jacques Periaux
044/048 - Multiple Scale Modeling in Spatial and/or Temporal Domains: Theoretical and Practical Aspects					
Pacific Concourse G	Keynote: Advanced Multi-Scale Modeling of Composite Materials and Structures with the DIGIMAT software suite		Modelling and Influence on the Linear Elastic Properties of Irregular Honeycomb-Structures	Homogenized Time-Dependent Behavior of Fiber-Reinforced Laminates	Mid-Frequency Response of Structures with Integral Compliant Mechanisms: Verification & Validation
	Roger Assaker, L. Adam, N. Bilger, Issam Doghri, J.S. Gerard		Daniel Schwarzer, Sébastien Gatouillat, Carsten Proppe	Tetsuya Matsuda, Yuichi Fukuta, Keisuke Nakata	Ercan Dede, Greg Hulbert
Pacific Concourse H					
032 - Inverse Problems					
Pacific Concourse I	Advanced Computational Optimization for Inverse Problems in Linear and Nonlinear Elasticity	Early Detection of Breast Cancer: Feasibility of Inverse Estimation of Tumor Size and Location	Quantitative Material Characterization of Biological Structures Using Vibroacoustic Testing Methods	Imaging Microfiltration Coefficient in Vascularized Soft Tissues	Applying Time-Reversal Methods to Imaging Vertical Geologic Faults
	Paul Barbone, Jeffrey C. Bamber, Sevan Goenzen, Nachiket H. Gokhale, Timothy J. Hall, Elise F. Morgan, Assad Oberai, Michael S. Richards, Carlos Rivas	Lorraine Olson, Jason Butcher	John Brigham, Wilkins Aquino, Mostafa Fatemi, James Greenleaf, Farid Mitri	Ricardo Leiderman, Jeffrey Bamber, Paul Barbone, Gearoid Berry, Assad Oberai	Polina Zheglova, Joyce R. McLaughlin, Daniel Renzi, Steven W. Roecker, Jeong-Rock Yoon
004 - Computational Geomechanics Minisymposium					
Pacific Concourse J	3D Numerical Tool for Simulation of Fully Coupled Nonlinear Response in Saturated Porous Medium	Three-Dimensional Finite Element Implementation for a Dynamic Solid-Fluid Mixture at Finite Strain	Analysis of Problems in Biot Consolidation Via a Mixed Least Squares Method	A Locally Conservative Finite Element Method for Coupled Flow and Reservoir Geomechanics	A Lagrangian Method for Two-Phase Flow Simulation
	Mahdi Taiebat, Zhao Cheng, Yannis Dafalias, Boris Jeremic	Davoud Ebrahimi, Richard Regueiro	Maria Tchonkova, John Peters, Stein Sture	Birendra Jha, Ruben Juanes	Matthias Preisig, Thomas Zimmermann
031 - Computational Methods for Micro and Nano Systems					
Pacific Concourse K	Characterization of Instabilities in Small Atomic Systems Using Continuum Stress and Strain Measure	Molecular Modeling of Separation Performance from a MEMS Gas Chromatograph	Dielectrophoresis Simulation for MEMS Applications: Comparison of the Different Bumerical Tools	Max-Ent Effective Free Energies of Proteins	
	Alejandro Pacheco	Nancy Iwamoto, Ulrich Bonne, Mike Rhodes	Véronique Rochus, Daniel Rixen	Jee Rim, Yashashree Kulkarni, Michael Ortiz	

Wednesday - Afternoon Session					
Room	**14:10**	**14:32**	**14:54**	**15:16**	**15:38**
101 - Computational Mechanics of Masonry Structures					
Pacific Concourse L	Non-Linear Static and Dynamic Analyses of One-Sided Rocking of Unreinforced Masonry Façades	A Multiscale Strategy for the Modelling of Failure in Masonry Plates	Multiscale Mechanical Modeling and Numerical Simulations for Brick/Block Masonry	Finite Element Limit Analysis of Arch-Fill Interaction in Arch Bridges	
	Luigi Sorrentino, Sashi Kunnath, Giorgio Monti, Giuseppe Scalora	Thierry Massart, Adama Diaby, Benoit Mercatoris	Patrizia Trovalusci, Vittorio Sansalone	Aandrea Cavicchi, Luigi Gambarotta	
026 - Computational Methods for Fluid-Structure Interaction					
Pacific Concourse M	Keynote: Advances in Fluid-Structure Interaction with Incompressible Fluids and Thin-Walled Structures		Developing a Framework for the Simulation of Flow-Membrane Interactions	Modeling Large Motion of Thin Flexible Structures Immersed in a Flow by the Enriched Space Time Meth	
	Wolfgang A. Wall, Axel Gerstenberger, Ulrich Kuettler		Alexander Kupzok, Kai-Uwe Bletzinger, Roland Wuechner	Antoine Legay, Andreas Kolke	
065 - Advances in Boundary Element Methods					
Pacific Concourse N	Keynote: A Fast Multipole BEM for Solving 2-D Stokes Flow Problems Using A Dual BIE Formulation		Scalable BETI for Contact Problems	Quasi-Analytic Hypersingular Galerkin BEM for 3D Potential Problems	Quantum Dots in an Anisotropic Piezoelectric Half-space Semiconductor Substrate
	Yijun Liu		Zdenek Dostal	Sylvain Nintcheu, Leonard Gray, Theodore Kaplan	Yan Zhang, Mitsunori Denda, Ernie Pan
061 - Trends in Unstructured Mesh Generation					
Pacific Concourse O	Mesh Improvement for Quadrilateral Element using Coarsening and Refinement Techniques	Formulation of Delaunay Field for Hexahedral Meshing	On Combining Mesh Redistribution with H-Adaptivity	Techniques for Robust Target-to-Source Projection for Many-to-Many Sweeping	
	Takuji Hayashi, Masanori Kikuchi, Yoshitaka Wada	Damrong Guoy, Jeff Erickson	Derek Gaston, Larisa Branets, Graham Carey, Benjamin Kirk, John Peterson, Roy Stogner	Mike Borden, Michael Brewer	

Wednesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
Banquet Setup					
Grand Ballroom B					
Banquet Setup					
Grand Ballroom C					
051 - Mathematical and Computational Aspects of Multi-scale and Multi-physics					
Regency A	An Atomistic-to-Continuum Coupling Method for Non-Equilibrium Heat Transfer in Solids	Helicoidal Morphology and Bistability in Engineering Structures	A Framework for Development of Multi-Physics Simulators Based on a Language of Patterns		
	Greg Wagner, Reese Jones, Jeremy Templeton, Michael Parks	Seubpong Leelavanichkul, Andrej Cherkaev	Felix Santos, José Andrade, Eduardo Brito Jr., José Silva		
066 - Modeling and Simulation of Nano Materials and Mechanics					
Regency B	Coupled Experimental-Numerical Analysis of Nanoindentation on Pure Nickel	Parameterized Modeling of Thermal Stresses in 3D-IC Inter-wafer Vias	Multiscale Simulations of Physical and Mechanical Properties of Multifunctional Polymer Nanocomposit	Modeling Glass Transition Temperature (Tg) and Stress Gradient in Polymer Nanostructure	
	Peter Berke, Thierry Massart, Enrico Tam	Chaffra Awo-Affouda, Max Bloomfield, Tim Cale	Richard Gee, Naida Lacevic	Anand Srivastava, Somnath Ghosh	
047 - Recent Advances in Modeling of Engineering Materials/Systems					
Plaza Room	Hybrid Earthquake Response Simulation on Linked Structure System with Low Yield Point Steel Damper	Simulation of Material Failure Behavior under Different Loading Rates Using Molecular Dynamics	Development of Experimental Strength Equation for GFRP Structural Member Under Axial Compression	Dynamic Analysis of Soil-Pile-Structure Interaction Considering Complicated Soil Profile	
	Jae-hyouk Choi, Jeong-sup Kim	Yun Mook Lim, Juwhan Kim, Kunhwi Kim, Jihoon Lim	Yeol choi, Wonhwa Hong, Robert. L Yuan	Jang Ho Park, Jee-Sang Kim, Jaegyun Park	
Banquet Setup					
Bayview A					
Banquet Setup					
Bayview B					
008 - Multiscale Damage and Failure Mechanics					
Seacliff A	Multiresolution Continuum Theory for Hierarchical Materials	Hierarchical Multi-Scale Modeling of Fragmentation in Materials	Boundary Condition Effects on Damage Localization in Multiscale Analysis	Modeling Mechanical Response and Failure of HE Using Dominant Crack Approach	Micro-Plane Damage Based Model for Concrete under Monotonic and Cyclic Loadings
	Cahal McVeigh, Wing Kam Liu	Parag Dixit, David Benson, Aaron Fisher, Alice Koniges	Helen Inglis, Philippe Geubelle, Karel Matous	Partha Rangaswamy, Bartlomiej Benedikt, Matthew Lewis	Mojtaba Labibzadeh, S. A. Sadrnejad

Wednesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
097 - Biofluids and Coupled Problems in Biomechanics					
Seacliff B	Fluid-Structure Interaction Simulations on Abdominal Aortic Aneurysm Models	FSI in a Porous Media Applied to Perfusion of the Heart	Simulations of Blood Flow in Left Atrial Appendage	On the Sensitivity of Critical Plaque-Cap Stress in Stenosed Arteries	
	Sinead Kelly, Malachy O'Rourke	Irene Vignon-Clementel	Mickael Gay, Lucy Zhang	Jonathan Wenk, Panayiotis Papadopoulos, T. I. Zohdi	
099 - Finite Element Methods in Environmental Fluid Mechanics					
Seacliff C	3D Multi-Scale Ocean Modelling Using Adapting Unstructured Meshes	Numerical Simulation for Eutrophication in Lake Suwa	Continuous/Discontinuous Stabilized Mixed Finite Element Methods For Darcy Flow	Estimation of River Current Using Kalman Filter Finite Element Method	
	Gerard Gorman, Fangxin Fang, David Ham, Stephan Kramer, Hedong Liu, Christopher Pain, Matthew Piggott	Yoshitaka Wada, Masanori Kikuchi	Maicon Ribeiro Correa, Abimael Loula	Yasunori Ojima, Mutsuto Kawahara	
073 - Structural Stability					
Seacliff D	Conditions for Symmetric, Antisymmetric, and Zero-Stiffness Bifurcation in the Framework of the FEM	Bifurcation Analyses for Ductile Necking Behavior	Nonlinear Inelastic Analysis of Frames Steel Buildings		
	Herbert Mang, Xin Jia	Shigenobu Okazawa	Joao de Deus Fonseca Neto, Paulo M. Pimenta		
010/057 - Accomplishments and Challenges in Verification and Validation					
Golden Gate Room	Overview ASME Guide for Verification and Validation in Computational Solid Mechanics	Panel Discussion on ASME PTC-60 End-to-End V&V Example			
	Len Schwer				
120 - The k-Version of the Finite Element Method and h-p-k Adaptive Processes					
Marina Room	Isogeometric Higher Order Methods	K- Version Least Squares Finite Element Method for a Fluid Structure Interaction Problem	Goal-Oriented Adaptivity for Fluid-Structure Interaction	A Mathematical Model and Computational Approach for Fluid-Solid Interaction	
	Thomas J.R. Hughes	Wayne McGee, Padmanabhan Seshaiyer	Kristoffer van der Zee, Rene de Borst, Harald van Brummelen	Abhijit Dumbre, J. N. Reddy, Albert Romkes, Karan Surana	
106 - Multiscale Modeling of Materials					
Garden Room A	Multi-Scale Characterization and Modeling of Ductile Fracture in Cast Aluminum Alloys	Homogenization and Equivalent Mechanical Properties of Hexagonal and Re-entrant Lattices	A Metamodeling-based Optimization Approach for Determining Mesoscale Material Properties of AL6022		
	Jie Bai, Somnath Ghosh, Dakshinamurthy Valiveti	Stefano Gonella, Massimo Ruzzene	Peter Hassing, Hongbing Fang		
108 - Large Scale and Distributed Computing: Application Development Towards Petascale Platforms					
Garden Room B	Constructing Adaptive Meshes for Large Scale Finite Element Applications Using Parallel Octrees	A Framework for Performing Fluid Dynamics Simulations on Large-Scale Distributed Computers	Parallel Performance of IPSAP/Explicit for Contact-Impact Simulation		
	Rahul Sampath, George Biros, Hari Sundar	Onkar Sahni, Kenneth Jansen, Mark Shephard	Ji Joong Moon, Seung Jo Kim, Seung Hoon Paik		

Wednesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
019 - Computational Biomechanics: From Biomolecules to Organisms					
Pacific Concourse A	Image-Based Assessment of Hemodynamics in the Progression of Intracranial Aneurysm Disease	Characterizing Unsteady Flow Structures in Large Vessels	Dynamic Variation of Shear Stresses in the Outflow Tract of the Chick Developing Heart	Development and Validation of a Strongly Coupled Approach for Heart Valve Simulations	Biomechanics of Epidermal Wound Repair in Embryos: A Dynamic Model and Its BIological Implications
	David Saloner	Shawn Shadden	Sandra Rugonyi, Aiping Liu, Ruikang Wang	Sarah Vigmostad, Krishnan B. Chandran, Sreedevi Krishnan, H. S. Udaykumar	Alexander Sadovsky, Frederic Wan
033 - Computational Mechanics of Random Media					
Pacific Concourse B	Towards Thermomechanics of Fractal Media	Estimate for the Load Capacity of Perforated and Porous Membranes	Improved Solutions of Stochastically Heterogeneous Micro-Beams by Utilizing Two-Point Data in Higher		
	Martin Ostoja-Starzewski	Adam Kovacs, Andras Kovacs	David Zarrouk, Eli Altus		
089 - Nanoscale Modeling and Simulation in Mechanics of Materials					
Pacific Concourse C	The Influences of Grain Size and Deformation Rate on the Crack Growth Behavior in Nanocrystalline Fe	Phase Field Modeling of Martensitic Microstructure and Nucleation	Atomistic Modeling of Martensitic Transformation in Ni-based Alloys: Linking to Multiscale Modeling		
	Ryosuke Matsumoto, Yoshihiro Kubota, Noriyuki Miyazaki	Dong-Wook Lee	Ken-ichi Saitoh, Wing Kam Liu		
006 - Symposium on Multiscale Methods and Applications to Nano- and Bio- Mechanics and Materials					
Pacific Concourse D	Stabilized Multiple Time Stepping Method for Coupling Multiple Time Scales in Molecular Dynamics	Three Dimensional Multiresolution Finite Element Simulation of Multi-Length Scale Localization	Optimized Coupling Between Dynamic Atomistic and Continuum Models for Solids	Realization of Generalized Mathematical Homogenization	
	Phani Nukala	Rong Tian, Wing Kam Liu, Cahal McVeigh	Brent Kraczek, Robert Haber, Duane Johnson	Aiqin Li, Jacob Fish, Renge Li	
105 - Numerical Techniques for the Modeling of Failure in Solids					
Pacific Concourse E	Strategies for Analysis of Reinforced Concrete with Embedded Cracks	Size Effect Analysis of Tensile Strength in Concrete Specimens Using Embedded Discontinuities	Influence of Aggregate Shape on Fracture Behaviour in Concrete	Frame Elements with Mixed Formulation for Singular Section Response and Bifurcation	Modal Approach to Structural Dynamic Fracture
	Benjamin Spencer, P. Benson Shing	Luis Fernandez-Baqueiro, Henry Perez, Jorge Varela	Hau-Kit Man, Jan G.M. van Mier	Chin-Long Lee, Filip C. Filippou	Pedro Marcal, Nobuki Yamagata
115 - Contact, Impact and Crashworthiness					
Pacific Concourse F	Investigation of Controlled Building Collapse – Analysis and Validation	Crash Simulations of Road Safety Barriers for High Containment Levels	Numerical Simulation of Snow-Tire Interaction Using 3-D Patterned Tire Model	V&V Procedures of Fullscale Vehicle Crashworthiness and Roadside Hardware Performance Evaluation	
	Gunther Blankenhorn, Steffen Mattern, Karl Schweizerhof	Zoran Ren, Matej Borovinsek, Miran Ulbin, Matej Vesenjak	Jae-Hoon Lee, Jin-Rae Cho, Joo-Hyoung Choi	Steve Kan, Murat Buyuk, Dhafer Marzougui	

Wednesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
044/048 - Multiple Scale Modeling in Spatial and/or Temporal Domains: Theoretical and Practical Aspects					
Pacific Concourse G	A Multi-Scale Model of Fabric Material Under Impact	Crash Analysis of Honeycomb Structures by the Homogenization Method	High-Velocity Impact Simulations on Fibrous Materials	Multiscale Construction and Large-Scale Simulation of Dynamically Loaded Structural Fabric	Multiscale Modelling of the Seismic Response of Precast Buildings
	Ben Nadler	Gaku Nakamura, Kohei Yuge	Jorge López-Puente, Ben Nadler, Panayiotis Papadopoulos	David Powell, T. I. Zohdi	Pablo Mata, Alex H. Barbat, Sergio Oller
Pacific Concourse H					
032 - Inverse Problems					
Pacific Concourse I	Keynote: How Statistics Helps		A New Approach to Linear Sampling in Inverse Scattering	Full-Waveform-Based Shape Detection and Localization of a Scatterer Embedded in a Halfplane	Determination of the Profile of Nanostructures Using Optical Scattering Measurements and Adjoint Equations
	Philip Stark		Michele Piana, Riccardo Aramini, Massimo Brignone, Joe Coyle	Loukas Kallivokas, Chanseok Jeong, Seong-Won Na	Gonzalo Feijoo
004 - Computational Geomechanics Minisymposium					
Pacific Concourse J	Modelling the Mechanical Consequences of Corrosion in an Old Reinforced Concrete Structures	A Long-Term Accumulation Model for Soils Under Low-Amplitude Cyclic Loading	Using Geosynthetic Materials in Railway Embankments	Predicting the Optimum Bearing Capacity Pressure for Shallow Foundation Design through Neural Networ	
	Millard Alain, L'Hostis Valérie	Stijn François, Geert Degrande, Wim Haegeman, Christian Karg	Tenea Diana Doina, Dragos Vintila	Kofi Nelson-Owusu	
031 - Computational Methods for Micro and Nano Systems					
Pacific Concourse K	Efficient DSMC Modeling Techniques for Thermally Driven Micro/Nano Gas Flows	Gas Dissipation in Highly Perforated MEMS by Means of BGK and Free-Molecular Models	A Kinetic Model for Fluid-Wall Interaction	Nano Mechanics of Contact using Hybrid Molecular Dynamics and Monte Carlo techniques	Performance Enhancement of Low Mach and Reynolds Compressible Microflow Solvers
	Wenjing Ye, Nathan Masters	Attilio Frangi, Aldo Ghisi	Livio Gibelli, Aldo Frezzotti	Haneesh Kesari, Wei Cai, Adrian Lew	Jafar Alzaeili, Karim Mazaheri
101 - Computational Mechanics of Masonry Structures					
Pacific Concourse L	Hybrid Discrete/Finite Element Model with Rough Surface for Fracture Analysis	Two Models of Interfaces for Masonry Structures	Investigation of Load Resisting Mechanism of Masonry Infilled RC Frames with Computational Models	In-Plane and Out-of-Plane Computational Modeling of URM Infill Walls in RC Frames	
	Nuno Monteiro Azevedo, J. Vieira de Lemos	Frédéric Lebon, Fazia Fouchal, Céline Pelissou, Isabelle Titeux	P. Benson Shing, Andreas Stavridis	Alidad Hashemi, Khalid Mosalam	

Wednesday - Late Afternoon Session					
Room	**16:30**	**16:52**	**17:14**	**17:36**	**17:58**
026 - Computational Methods for Fluid-Structure Interaction					
Pacific Concourse M	Design and Analysis of Higher-Order Explicit Time-Integrators for CFD Computations on Moving Grids	A Coupled Structural-Acoustic Formulation for Active-Passive Interior Noise Reduction	An Efficient CSD/CFD Coupled Finite Element Scheme for Blast Simulations		
	Ajaykumar Rajasekharan, Charbel Farhat	Jean-François Deü, Walid Larbi, Roger Ohayon	Orlando Soto, Joseph Baum, Rainald Lohner, Eric Mestreau		
065 - Advances in Boundary Element Methods					
Pacific Concourse N	Fast Multipole Boundary Integral Equation Method for 3D Seismic Wave Propagation in Alluvial Basins	A Fast Multipole Boundary Element Method for 2-D Acoustic Wave Problems	Coupled Analysis of Wave Propagation with Time-Domain Boundary Element Methods	A Formulation Based on Localized Lagrange Multipliers for BEM-FEM Coupling in Contact Problems	An Acceleration of Time-Domain BIEM for Elastodynamic Crack Problems
	Stéphanie Chaillat, Marc Bonnet, Jean-François Semblat	Milind Bapat, Yijun Liu	Thomas Rueberg, Martin Schanz	Jose A. Gonzalez, Ramon Abascal, K.-C. Park	Toru Takahashi, Kazuki Koketsu, Hiroe Miyake
061 - Trends in Unstructured Mesh Generation					
Pacific Concourse O	Geometrical Modeling and Meshing of Granular Domains	Triangulation of Microstructure using Recursive Subdivision and Advancing Front Technique	A Rapid Meshing Technique for Studying Near-Surface Phenomena	Adaptive Tetrahedral Mesh Generation for Intelligent Forging Simulation	Automatic Meshing of 3-D Respiratory Geometries
	Azeddine Benabbou, Houman Borouchaki, Patrick Laug, Jian Lu	Daniel Rypl, Zdenek Bittnar	Amanda Hines, Owen Eslinger	Mincheol Lee, ManSoo Joun	Andrew Kuprat, Daniel Einstein

Thursday, July 26

Technical Session 10 – Morning Session
8:15 – 10:05 am

Technical Session 11 – Mid-Morning Session
10:35 am – 1:10 pm

Thursday - Morning Session					
Room	**8:15**	**8:37**	**8:59**	**9:21**	**9:43**
Grand Ballroom B					
028 - Uncertainty Modeling and Quantification in Computational Mechanics					
Grand Ballroom C	A Multiple-Output Bayes Linear Emulator Applied to Uncertainty Quantification of Geophysical Flows	Fast Algorithms for Uncertainty Estimation and Propagation in Large Scale Linear Dynamical Systems	Multi-Scale Modeling and Analysis of Time-Variant Structural Reliability Problems	A Homogenization Bases Method for Linking Global Properties to Local Variations in Random Media	
	Keith Dalbey, Abani Patra, E. Bruce Pitman, Michael Sheridan	H. Pearl Flath, Volkan Akcelik, Omar Ghattas, Judy Hill, Bart van Bloemen Waanders, Lucas Wilcox, Karen Willcox	Andres Wellmann Jelic, Dietrich Hartmann	Mazdak P. Tootkaboni, Lori Graham-Brady	
080 - Computational Aspects of the Stochastic Finite Element Method					
Regency A	Uncertainty Quantification of Large-Scale Systems Using Domain Decomposition	A Computationally Efficient Method for the Buckling Analysis of Shells with Random Imperfections	Optimization of Complex Systems in the presence of Uncertainties		
	Debraj Ghosh, Philip Avery, Charbel Farhat	Vissarion Papadopoulos, Dimos C. Charmpis, Manolis Papadrakakis	Phaedon-Stelios Koutsourelakis		
030 - Numerical Modeling and Simulation on Nanoscale Materials and Devices					
Regency B	An Enriched Space-Time FEM Approach to Coupled Atomistic-Continuum Simulation	Extensions of the Bridging Domain Method	Adaptive Quasicontinuum for Curved Crystalline Structures	Continuum Models of Single- and Multi-Walled Carbon Nanotubes	Numerical Modeling and Simulation of Nanotube-Based Composites and Devices
	Shardool Chirputkar, Dong Qian	Mei Xu, Ted Belytschko	Jong Youn Park, Seyoung Im, Youngmin Lee	Aaron Sears, R. Batra	Shaoping Xiao, Weixuan Yang
068 - The Foundation: The Teaching of Finite Elements at Undergraduate Level					
Plaza Room	Teaching Finite Element Simulation in Conjunction with Experiment and Theory in an Integrated System	Two Concepts and Two Softwares Strategies for Understanding Mechanics and the Finite Element Method	Fundamentals, Education and Application of FEM in Structural Mechanics		
	Vincent C. Prantil, William E. Howard	Göran Sandberg, Jonas Lindemann, Karl-Gunnar Olsson, Pierre Olsson, Kent Persson	Azer Kasimzade		
066 - Modeling and Simulation of Nano Materials and Mechanics					
Bayview A	Dislocation Dynamics and Boundary Element Simulation of Dislocation-Precipitate Interaction	Three Dimensional Dislocation Dynamics Modeling of Size Effects on the Strength of Micro-crystals	Level Set Dislocation Dynamics Simulation During Heteroepitaxial Film Growth	2D Dislocations Modelled by Interior Discontinuities in a Discontinuous Galerkin Method	
	Akiyuki Takahashi, Nasr M. Ghoniem	Jaafar El-Awady, Nasr M. Ghoniem	Siu Sin Quek, Kevin Chu, David Srolovitz, Yang Xiang, Yong-Wei Zhang	Robert Gracie, Ted Belytschko	
DS Simulia (ABAQUS) Workshop					
Bayview B	Ted Belytschko, Jacob Fish				

Thursday - Morning Session					
Room	**8:15**	**8:37**	**8:59**	**9:21**	**9:43**
008 - Multiscale Damage and Failure Mechanics					
Seacliff A	Keynote: A Computational Damage Mesomodel Based on Micromechanics, with Applications Using ABAQUS		Numerical Identification of an Anisotropic Damage Model Parameter with 3D Discrete Element Model	A Dynamic Parallel Finite-Element Implementation of a Linear Thermo-Elastic Material with Damage	Finite-Element Based Modeling of Damage in Brittle Materials: From Micro to Macro
	Gilles Lubineau, Pierre Ladeveze		Arnaud Delaplace, Rodrigue Desmorat	Jonathan S. Pitt, Francesco Costanzo	Reuben Kraft, JF Molinari, KT Ramesh
071 - Computational Methods in Composite Materials Research					
Seacliff B	On Fast and Robust Optimization Methodologies for Layout and Material Design of Laminated Structures	Application of Kalman Filtering to the Energy-Based Material Characterization	The Optimization of the Functioning Parameters of Mechanical Ensembles Made from Composite Materials	Simulating the Dynamics of Particles Onteracting with Solidification Fronts	
	Abbas S. Milani, Rohan C. Abeyaratne, Dan D. Frey, Hungjen Wang	Jan Wei Pan, Tomonari Furukawa, David Kellermann	Ilie Butnariu, Ioana Butnariu, Nicolae Constantin	Justin Garvin, H. S. Udaykumar, Yi Yang	
018 - Clinical Bimechanics of the Spine: Computational Mechanics Challenges					
Seacliff C	An Introduction to Clinical Biomechanics of the Spine	Surgical Navigation for Complex Spinal Procedures	Calculating 3D Angles and Helical Axis of Motion in Spine Research		
	Jeffrey C. Lotz, Jenni M. Buckley, Oliver O'Reilly	Jenni M. Buckley, Jeffrey C. Lotz	Neil Crawford		
119 - Computational Wave Propagation: Hierarchical Modeling and Adaptivity					
Seacliff D	Keynote: hp-Adaptive Finite Elements for Wave Propagation Problems		Intelligent Adaptive Fluid-Structure Interaction Systems	Generalized Finite Element Method for Helmholtz Equation	Adaptive High-Order Absorbing Boundary Conditions
	Leszek Demkowicz		Roger Ohayon	Theofanis Strouboulis, Ivo Babuska, Realino Hidajat	Dan Givoli, Thomas Hagstrom
Golden Gate Room					
120 - The k-Version of the Finite Element Method and h-p-k Adaptive Processes					
Marina Room	On the H-P-K-S of H-P-K	hpk Computational Framework for Solid Continuum using Eulerian Description	A New Computational Framework for Numerical Solutions of Polymer Flows for High Deborah Numbers	Higher Order Global Differentiability Local Approximations for Triangular Elements	Geometry-Adaptive Refinement of Hexahedral Element Mesh
	Jim Brown, Will Ramsey	Salahi Basaran, J. N. Reddy, Albert Romkes, Karan Surana	Kedar Deshpande, J. N. Reddy, Karan Surana	Rajesh Maduri, J. N. Reddy, Karan Surana	Hongmei Zhang, Guoqun Zhao
095 - Computational Methods for Large Structures and Materials					
Garden Room A	Nonlinear Finite Element Modelling of Fibre Pullout from Cementitious Matrix	Development of Fast Frequency Response Analysis (FFRA) for Large Scale Structural Finite Element Mod	Static Analysis of Sandwich Panels with Triangular or Hexagonal Honeycomb Core		
	Robert Xiao, Chee Chin	Changwan Kim	Hazem Soliman, Rakesh Kapania		

Thursday - Morning Session					
Room	**8:15**	**8:37**	**8:59**	**9:21**	**9:43**
043 - Discrete and Finite Element Methods and Applications					
Garden Room B	Simulation of Charged Particulate Sprays Striking a Surface	A 3D X-ray Vision System for Validating DEM Simulations ofTtumbling Mills	Rheology of Granular Materials with a Discrete Element Method	Cohesive Powder Blending Kinetics	
	Diego Arbelaez, T. I. Zohdi	Indresan Govender	Jerome Fortin, Hanani Ould Bah, Dumont Serge	Scott Johnson, Benjamin Cook, John Williams	
Pacific Concourse A					
088 - Air/Water Flow in Near Surface Environments					
Pacific Concourse B	A Local Discontinuous Galerkin Framework for Flow in the Vadose Zone	Modeling Preferential Flow in Subsurface	Robust Nonlinear Iterative Methods for Time-Dependent Unsaturated Flow	A Computational Tool for Creating Synthetic, Small-scale Infrared Imagery of Vegetated Soil Surfaces	
	Clint Dawson	Ralph Showalter, Malgorzata Peszynska, Son-Young Yi	Chris Kees, Matthew Farthing, Lea Jenkins, Tim Kelley, Scott Pope	John Peters, Jerry Ballard, Stacy Howington, Larry Lynch	
Pacific Concourse C					
006 - Symposium on Multiscale Methods and Applications to Nano- and Bio- Mechanics and Materials					
Pacific Concourse D	Natural Frequency amd Flow Measurements of Fluid Conveying Single Walled Carbon Nanotubes	Size Effect and Mesoscopic Models for the Mechanics of Multi-walled Carbon Nanotubes	Enhanced Molecular Dynamics for Simulating Thermal and Charge Transport Phenomena	Multiscale Simulation of Low-Dimensional Carbon Nanostructures Based on Spatial Secant Model	
	Chun Lu, CD Reddy	Marino Arroyo, Irene Arias	Reese Jones, Jeremy Templeton, Greg Wagner	Qingjin Zheng, Dong Qian	
105 - Numerical Techniques for the Modeling of Failure in Solids					
Pacific Concourse E	A Study of Dynamic Cohesive Fracture Using a Spacetime Discontinuous Galerkin Model	Numerical Simulation of 3D Crack Growth with Remeshing Using a Discontinous Galerkin Formulation	A Computational Methodology for Simulating the Pervasive Failure of Materials and Structures Under E	An Investigation of Adhesion in Microcontacts – Ductile and Brittle Separation	
	Reza Abedi, Robert Haber	Vincent Chiaruttini, Frederic Feyel	Joseph Bishop	George G. Adams, Lei Chen, Yan Du, Nicol E. McGruer	

Thursday - Morning Session					
Room	**8:15**	**8:37**	**8:59**	**9:21**	**9:43**
115 - Contact, Impact and Crashworthiness					
Pacific Concourse F	Coupled Reproducing Kernel and Finite Element Formulation for Penetration Mechanics	Implications of Using Reduced Scale Results in Predicting Shock Environment for Full-Scale Structure	Unknowns versus Uncertainty in Accident Reconstruction Simulations	Modeling of Structural Steel Ductile Failure with Cyclic Damaged Plasticity	Dynamic Contact Formulation Using Dual Lagrange Multipliers
	Pai-Chen Guan, J. S. Chen, K. Danielson, Slawson Thomas.R.	Mostafiz Chowdhury	Alan Kushner	Yuli Huang, Stephen Mahin	Ekkehard Ramm, Stephan Brunssen, Stefan Hartmann, Barbara Wohlmuth
044/048 - Multiple Scale Modeling in Spatial and/or Temporal Domains: Theoretical and Practical Aspects					
Pacific Concourse G	Multi-scale Analysis of Thin Film Considering Surface Effects	Nano/ Micro Scale Simulations of the Elastic Properties of Polycrystalline Silicon	Nano-Scale Surface Characteristic of Adhesive Contacts: A Continuum-Atomistic Multiscale Simulation	Numerical Procedure for Polycrystalline Ferroelectric Problems Using Landau fs Phenomenological Model	
	Maenghyo Cho, Jinbok Choi, Kwangsub Jung	J. K Lee, Jaehwan Choi, Han Sung Kim, Nak Kyu Lee, Wolfgang Windl	Tianxiang Liu, Geng Liu, Peter Wriggers	Gakuji Nagai, Hiroaki Uramoto, Katsuhiko Watanabe	
036 - Recent Advances in Modeling Functionally Graded Materials					
Pacific Concourse H	Analytical and Computational Methods for Contact Mechanics Analysis of Laterally Graded Materials	K-Dominant Region in Functionally Graded Materials Under Mixed Mode Loading	Dependence of Crack-tip Singularity on Loading Functions	Computational Fracture Modeling of Nonhomogeneous Materials under Thermomechanical Loads	Stochastic Fracture of Functionally Graded Materials Using Multiscale Models
	Mehmet Guler, Serkan Dag, Bora Yildirim	Gunay Anlas, Gokce Altay, John Lambros	Youn-Sha Chan, Baofeng Feng, Glaucio Paulino, Alok Sutradhar	Jeong-Ho Kim, Amit KC	Arindam Chakraborty, Sharif Rahman
032 - Inverse Problems					
Pacific Concourse I	Identification of Material Properties of Orthotropic Elastic Cylinders Immersed in Fluid	Iterative Regularization of Inverse Problems Using Adaptive Meshes	Identification of Alloy Solidification Parameters	Inverse Identification and Imaging of Young's Modulus in Biological Tissue	An Analysis of the Optimization Formulation of Elastic Inverse Problems
	Daniel Rosario, Wilkins Aquino, John Brigham	Guillaume Puel, Denis Aubry	Ewa Majchrzak	Miguel Aguilo, Wilkins Aquino	Carlos Rivas, Paul Barbone, Assad Oberai
Pacific Concourse J					
031 - Computational Methods for Micro and Nano Systems					
Pacific Concourse K	Plastic Deformation in Passivated Interconnect Lines	Plastic Deformation of Freestanding Cu Thin Films: The Effects of Film Thickness and Passivation	A Model for Plastic Strain Recovery in Freestanding Nanocrystalline Metal Thin Films	Continuum Modeling of Shock Response in Nanocrystals	
	Marisol Koslowski, Hariharanath Kavuri	Yong Xiang, Joost Vlassak	Jagannathan Rajagopalan, Jong Han, Taher Saif	Antoine Jerusalem, Raul Radovitzky	
101 - Computational Mechanics of Masonry Structures					
Pacific Concourse L	Computational Studies of Masonry Composites	A Micromechanical Continuum Model for the Analysis of Complex Masonry Structures	Micromechanically-Based Finite Elements for Coarse Analyses of Masonry Brickwork	A Continuum Damage Model Applied to a Stone Masonry Structure	
	Kaspar Willam, Ben Blackard, Byunghun Kim, Carlo Citto, Siva Mettupalayam	Chiara Calderini, Sergio Lagomarsino	Ginevra Salerno, Giuseppina Uva	Bruno Silva	

Thursday - Morning Session					
Room	**8:15**	**8:37**	**8:59**	**9:21**	**9:43**
026 - Computational Methods for Fluid-Structure Interaction					
Pacific Concourse M	Transient Solid Deformation and Fluid Cavitation Induced by UNDEX	Mesh Update Scheme for FSI Problem undergoing Large Deformation and Application	Adaptive Meshing in ALE Finite Element Analysis with Large Deformations	Instantaneous Collisions in Fluids	
	Wenfeng Xie, Zhanke Liu, Yin Lu Young	Yoshihiro Taki, Hiroaki Katori, Akihiro Koike, Akihiro Kudou	Facundo Del Pin	Eric Dimnet	
065 - Advances in Boundary Element Methods					
Pacific Concourse N	An Approach to Elastodynamic Modelling of Fault Slip in the Vicinity of Tabular Excavations	Testing Suitability of BEM for Quantum Dots and Wires	On A-Adaptive Algorithm of Boundary Element Method	One Regular Boundary Element Algorithm	
	John Napier	James Ramsey, Peter Chung, Ernie Pan	Mykola Polyakov, Olexandr Kochubey, Dmytro Yevdokymov	Olexandr Kochubey, Mykola Polyakov, Dmytro Yevdokymov	
061 - Trends in Unstructured Mesh Generation					
Pacific Concourse O	Gmsh: a Three-Dimensional FE Mesh Generator with Built-In Pre- and Post-Processing Facilities	Local Mesh Modifications to Correct Curvilinear Meshes for 3D Curved Domains	Isosurface Stuffing: Fast Tetrahedral Meshes with Good Dihedral Angles		
	Jean-Francois Remacle, Christophe Geuzaine	Lie-Quan Lee, Xiaojuan Luo, Mark Shephard	Jonathon Shewchuk, Francois Labelle		

Thursday - Mid-Morning Session							
Room	**10:35**	**10:57**	**11:19**	**11:41**	**12:03**	**12:25**	**12:47**
Ballroom B							
Ballroom C							
080 - Computational Aspects of the Stochastic Finite Element Method							
Regency A	Convergence and Applications of Multi-Element Probabilistic Collocation	Modeling Natural Convection in Random Porous Media	A Scheme to Consider Triple Random Parameters in the Evaluation of Random Response in Mindlin Plate				
	Jasmine Foo, George Karniadakis, Xiaoliang Wan	Xiang Ma, Nicholas Zabaras	Hyuk-Chun Noh, In-Ho Kim				
030 - Numerical Modeling and Simulation on Nanoscale Materials and Devices							
Regency B	Study of the Fracture of Amorphous Carbon Fracture with Molecular Dynamics: Flaw Size Dependence	Dislocation Dynamics in Non-Convex Domains Using Finite Elements with Embedded Discontinuities	A New Algorithm for Computation Related to Sparse Matrix Inverse	Residual Friction and Dissipation in Atomic-Scale Contacts Subject to Periodic Loading	A Quasicontinuum Study of Scale Effects in Uniaxially Compressed Au Nanopillars		
	Qiang Lu, Ted Belytschko, Nigel Marks	Ignacio Romero, Javier Llorca, Javier Segurado	Song Li, Eric Darve	Sabine Maier, Alexis Baratoff, Enrico Gnecco, Ernst Meyer, Anisoara Socoliuc	Jaime Marian, Jaroslaw Knap		
068 - The Foundation: The Teaching of Finite Elements at Undergraduate Level							
Plaza Room	Problem Based Learning Approach for the Analysis of Vibration by FEM in Undergraduate Studies	ForcePAD - An New User Interface Metaphor for Finite Element Modelling	The Global GFEM : An Alternative Approach for Teaching and Understanding the Finite Element Method.				
	Arvydas Palevicius, Nijole Ciuciulkiene, Vytautas Ostasevicius, Minvydas Ragulskis	Jonas Lindemann, Göran Sandberg	Jat du Toit				
066 - Modeling and Simulation of Nano Materials and Mechanics							
Bayview A	Plasticity Length Scales and Mechanisms Revealed by Marker Transport in Atomistic Simulations	Nucleation Modeling of Collective Prismatic Dislocation Loops under Nanoindentation	From Nanomechanical Science to Nanofabrication Technology: A New Route towards Nanotube Synthesis	Modeling Mechanical Properties of Nano Scale Alloys	Effect of Chemistry on Dislocation Core Properties in a-Fe:An Ab Initio-Based Approach		
	Pascal Bellon, Robert Averback, Alfredo Caro, Pavel Krasnochtchekov, Youhong Li, Samson Odunuga	Yoji Shibutani, Tomohito Tsuru	Feng Liu	Alfredo Caro	Zhengzheng Chen, Nasr M. Ghoniem, N. Kioussis		
DS Simulia (ABAQUS) Workshop							
Bayview B	Ted Belytschko, Jacob Fish						

Thursday – Mid-Morning Session							
Room	**10:35**	**10:57**	**11:19**	**11:41**	**12:03**	**12:25**	**12:47**
008 - Multiscale Damage and Failure Mechanics							
Seacliff A	Simulation of Micro-Structural Damage due to Frost in Hardened Cement Paste	Local Plasticity in Heterogeneous Materials: Analysis by Moving Window Generalized Method of Cells	3D Multiscale Analysis of the Dynamic Response of Heterogeneous Solids	Dynamic Analysis of Gas Interrupt Switchgear with Motor Driven Spring Operator Including Gas Flow			
	Michael Hain, Peter Wriggers	Katherine Acton, Lori Graham-Brady	Michael Breitenfeld, Philippe Geubelle	Ahn Il Chul			
071 - Computational Methods in Composite Materials Research							
Seacliff B	An Anisotropic Nonlinear Viscoelastic Model for Soft Fiber-Reinforced Composites	Thermo-mechanical Damage Modeling for Composite Materials	A Serial/Parallel Mixing Theory for the Seismic Analysis of RC Structures Reinforced with FRP	Simulations of Large Composite Structures Under Impact Loading			
	Thao Nguyen	Changsong Luo, Paul DesJardin	Sergio Oller, Alex H. Barbat, Xavier Martinez	Xinran Xiao, Paolo Feraboli			
018 - Clinical Bimechanics of the Spine: Computational Mechanics Challenges							
Seacliff C	Constitutive Modeling of Yield Behavior in Trabecular Bone Structures	Developing a Procedure for a Novel Treatment Based on Current Imaging Modalities in Spine	A Patient's Overview of the Orthopedics Industry				
	Atul Gupta, Harun Bayraktar, Tony Keaveny, Panayiotis Papadopoulos	Richard Pellegrino	Mark Mintzer				
119 - Computational Wave Propagation: Hierarchical Modeling and Adaptivity							
Seacliff D	Keynote: A Multiscale "Wave" Approach for Transient Dynamics and Vibroacoustics in Low and Medium Frequencies		Earthquake Analysis of Concrete Dams as a Wave-Propagation Problem	Finite Element Methods for Time and Frequency-Domain Structural Acoustics	A Space/Time Discontinuous Galerkin Method for the Solution of the Wave Equation in the Time-Domain	The Galerkin plus Residual Projected: A Nearly Optimal Finite Element Method Applied to Acoustics	
	Pierre Ladeveze		Ushnish Basu	Timothy Walsh, Clark Dohrmann, Garth Reese, Jerry Rouse	Steffen Petersen, Charbel Farhat, Radek Tezaur	Fernando Rochinha, Gustavo Alvarez, Eduardo Dutra do Carmo, Abimael Loula	
Golden Gate							
085 - Domain Decomposition Techniques for Coupled Problems in Science and Engineering							
Marina Room	Finite Difference Methods for Coupled Flow Interaction Transport Models	Aeroelastic Simulation of a Delta Wing at High Angles of Attack	A Multilevel Fluid-Structure Interaction Methodology in Computational Science and Engineering	A Numerical Computational Method for Large Deformations of Fluid-Solid Interaction Problems			
	Shelly McGee, Padmanabhan Seshaiyer	Peter Attar	Eugenio Aulisa, Sandro Manservisi, Padmanabhan Seshaiyer	Sandro Manservisi, Antonio Cervone			

Thursday - Mid-Morning Session							
Room	**10:35**	**10:57**	**11:19**	**11:41**	**12:03**	**12:25**	**12:47**
095 - Computational Methods for Large Structures and Materials							
Garden Room A	Nonlinear Finite Element Modelling On Fibre Reinforced Concrete Structures	Numerical and Analytical Simulation of Unbonded Flexible Risers Subjected to Combined Modes of Loadi	Semi-Analytical Free Vibration Analysis for Bundled-Tube Structures Considering Subgrade Deformation				
	Chee Chin	Hamid Bahai, Ali Bahtui, Giulio Alfano	Ke Li, Yaoqing Gong				
043 - Discrete and Finite Element Methods and Applications							
Garden Room B	Dynamics of Granular Layers on Vibrating Elastic Structures with Coupled DEM-FEM: the 2D case	Macroscale Modelling of Solids by Means of a Mechanistic Rigid Body and Spring Approach	Simulations of Fracture and Fragmentation of Geologic Materials using Combined FEM/DEM/SPH Analysis				
	Kitti Rattanadit, Florin Bobaru	Siro Casolo	Joseph Morris, Scott Johnson				
P.Concourse A							
088 - Air/Water Flow in Near Surface Environments							
Pacific Concourse B	Stochastic Performance Assessment Issues	Locally Conservative, Stabilized Finite Element Methods for Richards' Equation	An Alternative Approach for Solving Parabolic Type PDEs				
	Glenn Taylor	Matthew Farthing, John Chrispell, Lea Jenkins, Chris Kees	Jun Jia, Matthew Farthing				
102 - Nonlocal and Generalized Continuum Modeling of Solids							
Pacific Concourse C	Multiscale Computation of Nano/Micro Materials	Statistical and Field Models for Materials with an Evolving Microstructural Distribution	Micromorphic Plasticity and Balance Equations for Dry Particulate Materials: Preliminaries	On the Higher-Order Gradient Plasticity Theory and its Non-standard Boundary Condition	Formulation and Implementation of Cosserat Elastoplasticity for Localization Analysis	Numerical Assessment of Some Nonlocal Models of Ductile Fracture	
	James Lee, Youping Chen	Bob Svendsen	Richard Regueiro	Rashid K. Abu Al-Rub, George Z. Voyiadjis, Douglas J. Bammann, Elias C. Aifantis	Haydar Arslan, Stein Sture	Koffi Enakoutsa, Jean Baptiste Leblong	
006 - Symposium on Multiscale Methods and Applications to Nano- and Bio- Mechanics and Materials							
Pacific Concourse D	AtC Concurrent Coupling and Adaptive Model Selection	Direct Numerical Simulations of Self-Assembly in Nano-Colloidal Systems	Modeling of Trabecular Bone as Hierarchical Material Using Micro-CT Imaging and Nanoindentation				
	Mohan Nuggehally, Jacob Fish, Catlin Picu, Mark Shephard	Mohammad Abuzaid, Ying Sun	Ondrej Jirousek				
Pacific Concourse E							

Thursday - Mid-Morning Session							
Room	**10:35**	**10:57**	**11:19**	**11:41**	**12:03**	**12:25**	**12:47**
Pacific Concourse F							
117 - Recent Progress in A Posteriori Error Estimation							
Pacific Concourse G	Locking Free Matching of Different Three Dimensional Models in Structural Mechanics	Flux-Free Error Estimators with Exact Bounds	Accuracy Estimators in Quantity of Interest for Mechanical Computation	A Posteriori Error Estimation and HP-Adaptivity for Fourth-Order Problems	A Posteriori Estimation of Pointwise Gradient Errors	Computing Bounds to Exact Outputs of Helmholtz Equation in Three Space Dimensions	
	Mani Aouadi Saloua, Patrick Le Tallec	Pedro Diez, Antonio Huerta, Nuria Pares	Mohamed Guessasma, Pierre Badel, Patrice Coorevits, Josselin Delmas	Peter Moore, Marina Rangelova	Alan Demlow	Shahin Ghomeshi, Zhong Cheng, Marius Paraschivoiu	
Concourse H							
032 - Inverse Problems							
Pacific Concourse I	Determining Charge Density from Kelvin Probe Microscopy Images Using the Boundary Element Method	Direct Imaging Methods for Extended Targets	Identification in Transient Dynamics of Composite's Rupture Model Parameters by Using the CRE Method	A Fast Approximation of Equivalent Number of Parameters for Smoothing Spline Method			
	Yongxing Shen, David Barnett, Peter Pinsky	Hong-Kai Zhao	Hong-Minh Nguyen, Olivier Allix, Pierre Feissel	Shinichiro Aoe, Greg Hulbert			
027 - Collapse of Deepwater Pipelines							
Pacific Concourse J	Testing and Analyses to Support Ultra-Deepwater Pipeline Installation	Effect of the UOE Forming Process on the Structural Behavior of Steel Pipes	3D Simulations of Shell-Type Structures Using Meshfree and Hybrid	Consistent Pipe-elbow Element Formulation for Large Displacement Analyses	Finite Element Modeling of Collapse Propagation in Offshore Pipelines		
	Duane DeGeer	Eduardo Dvorkin, Luciano Mantovano, Javier Raffo, Rita Toscano	Nathaniel Collier	Carlos A. Almeida	Karim Abedi, Ahmad Reza Gharebaghi, Reza Talebpour		
031 - Computational methods for micro and nano systems							
Pacific Concourse K	Keynote: Promoting Intergranular Fracture Through Grain Strength, Grain Toughness, and Orientation		Drop Test Modelling of Packaged MEMS by a Simplified Multi-Scale Approach	Towards an Enriched Cohesive Zone Model for Interfacial Delamination in Microsystems	Relaxation of Randomly Perturbed Linear Viscoelastic Polycrystals with Free Grain Boundary Sliding		
	James Foulk III, George Johnson, Patrick Klein, Robert Ritchie		Alberto Corigliano, Fabrizio Cacchione, Aldo Ghisi, Stefano Mariani, Sarah Zerbini	Johannes van Dommelen, Marc G.D. Geers, Ron H.J. Peerlings, Mohammad Samimi, Bas van Hal	Angelo Simone, A. Duarte, Erik Van der Giessen		

Thursday - Mid-Morning Session							
Room	**10:35**	**10:57**	**11:19**	**11:41**	**12:03**	**12:25**	**12:47**
101 - Computational Mechanics of Masonry Structures							
Pacific Concourse L	Explicit Methods and Characteristic Lengths in Macro Modelling of Masonry	FE Limit Analysis Strategies for the Analysis of Masonry Structures In- and Out-of-Plane Loaded	Continuum Models for out of Plane Behaviour of Masonry Panels.				
	Manicka Dhanasekar	Antonio Tralli, Gabriele Milani, Enrico Milani	Nicola L. Rizzi, Valerio Varano				
026 - Computational Methods for Fluid-Structure Interaction							
Pacific Concourse M	Analytical Solution of the Approximate SGS Equation in the Advection-Diffusion-Reaction Equation	A New Stability Method for Singularly Perturbed Convection-Diffusion Equations					
	Beatriz Eguzkitza, Guillaume Houzeaux, Mariano Vazquez	Viswanath Ramakkagari, Joseph Flaherty					
Pacific Concourse N							
061 - Trends in Unstructured Mesh Generation							
Pacific Concourse O	Application of Smoothing Techniques for Aligning Meshes	A Continuous Sight of Iinterpolation Error for 3D Anisotropic Unstructured Mesh Adaptation	A Log(L/s)-Competitive Algorithm for No-Large-Angle Triangulation	3D Surface Mesh Regeneration Considering Curvatures			
	José M. Escobar, Rafael Montenegro, Gustavo Montero, Eduardo Rodríguez	Adrien Loseille, Frederic Alauzet	Don Sheehy, Gary Miller, Todd Phillips	Antonio Miranda, Anthony Ingraffea, Luiz Fernando Martha, Paul Wawrzynek			

Author Index

Abascal, Ramon, 68
Abati, Andrea, 61
Abdo, Jamil, 25
Abedi, Karim, 78
Abeyaratne, Rohan C., 71
Abu Al-Rub, Rashid K., 54, 77
Abuzaid, Mohammad, 77
Acton, Katherine, 76
Adachi, Taiji, 61
Adam, L., 62
Adams, George G., 72
Adeeb, Samer, 43
Adjerid, Slimane, 10, 22
Afzal, Muhammad, 55
Agarwal, Nitin, 23
Aguilo, Miguel, 73
Ahn, Hyung Taek, 19
Akbari Mousavi, Seyed AliAsghar, 27
Akbari, Jalal, 22
Akcelik, Volkan, 70
Akhmedzhanov, Farkhad, 25
Akiba, Hiroshi, 61
Akin, Ed, 36
Akita, Seiji, 56
Akkerman, Ido, 26
Alauzet, Frederic, 79
Alexander, Konyukhov, 20
Alexander, Kravchuk, 20
Alfano, Giulio, 77
Alford, Patrick, 43
Aliabadi, Shahrouz, 21
Al-Khateeb, Ashraf, 55
Allix, Olivier, 10, 60, 78
Allu, Srikanth, 60
Almara, Juan, 74
Almeida Neto, Edgard S., 29
Almeida, Sylvia, 27
Almomani, Thakir, 60
Alpman, Emre, 22
Altay, Gokce, 73
Altmann, Christoph, 45
Altus, Eli, 66
Aluru, Narayana, 23, 46
Alvarez, Gustavo, 76
Alves, Jose, 41
Alves, Leonardo, 57
Alzaeili, Jafar, 67
Ambrosi, Davide, 38
Amenitsch, Heinz, 56
Amirkhizi, Alireza, 23
Ammar, Amine, 22
Amsallem, David, 50
Andersen, Michael, 59
Anderson, Robert, 24
Andrade, Jose, 61
Andrade, José, 64
Andreykiv, Andriy, 32
Androsova, Margarita, 48
Angus, Doug, 28
Anlas, Gunay, 73
Anvari, Mona, 38
Aoe, Shinichiro, 78
Aramini, Riccardo, 67
Araya, Rodolfo, 59
Arbelaez, Diego, 2, 72
Arcaro, Vinicius, 50
Arciniega, Roman, 18
Arduino, Pedro, 48
Areias, Pedro, 45
Arias, Irene, 72
Arita, Masahiro, 61
Armero, Francisco, 13, 44, 46, 61
Arnold, Douglas, 9, 20, 41, 52
Arnst, Maarten, 46
Arroyo, Marino, 72
Arruda, Ellen, 48
Arsenlis, Athanasios, 54
Arslan, Haydar, 77
Artioli, Edoardo, 24
Arwade, Sanjay, 55, 57
Asahina, Daisuke, 21
Ashcraft, Cleve, 48
Ashida, Fumihiro, 61
Askari, Abe, 57
Assaad, Mahmoud, 23
Assaker, Roger, 62
Asta, Mark, 28
Atkiinson, John, 55
Attar, Peter, 76
Attard, Phil, 46
Aubry, Denis, 49, 73
Aubry, Sylvie, 28, 55
Auer, Martin, 56
Aulisa, Eugenio, 12, 76
Auricchio, Ferdinando, 12, 24, 29, 40
Auzins, Janis, 30
Averback, Robert, 75
Avery, Philip, 70
Awanou, Gerard, 60
Awo-Affouda, Chaffra, 64
Ayala, Gustavo, 38, 44, 57
Azadeh, Ali, 38
Azevedo, Teresa, 43
Babuska, Ivo, 11, 19, 37, 71
Baccouch, Mahboub, 22
Badia, Santiago, 22
Badruzzaman, Ahmed, 47
Baek, S., 38, 43, 55
Baer, Thomas, 29
Baesu, Eveline, 49
Baeza, Antonio, 45
Bahadirov, Gayrat, 30
Bahadirov, Kudrat, 30
Bahai, Hamid, 77
Bahtui, Ali, 77
Bai, Jie, 65
Baietto, Marie-Christine, 37
Bajaj, Chandrajit, 10, 19, 37, 39, 43, 44, 46, 47
Baker, AJ, 46
Baker, Graham, 26
Baker, Jack, 61
Baker, Lowell, 31
Bala Chandran, Ram, 27
Balachandran, Balakumar, 41
Balamurugan, V., 47
Balet, Olivier, 43
Ballard, Jerry, 72
Ballarini, Roberto, 58
Bamber, Jeffrey, 62
Bammann, Douglas J., 77
Banerjee, Biswajit, 19
Banerjee, Biswanath, 21

Banerjee, Uday, 19
Banihani, Suleiman, 19, 27
Bapat, Milind, 68
Barakat, Abdul, 10, 61
Baratoff, Alexis, 75
Barba, L. A., 24
Barbarosie, Cristian, 30
Barbat, Alex H., 67, 76
Barbone, Paul, 11, 62, 73
Barboteu, Mikael, 54
Barker, Andrew, 24
Barnett, David, 78
Barocas, Victor, 27
Barrenechea, Gabriel R., 59
Barros, Cathrina, 46
Barsoum, Roshdy, 20
Barth, Timothy, 20
Barthold, Franz-Joseph, 48
Barton, Nathan R., 54
Basaran, Salahi, 71
Baskin, Lev, 12, 55
Bass, Jon, 13, 61
Bastmeyer, Martin, 61
Basu, Ushnish, 76
Bathe, Mark, 39
Batra, R., 24, 31, 37, 41, 57, 58, 70
Baum, Joseph, 68
Bauman, Paul, 32, 61
Bayoumi, Hassan, 18, 48, 59
Bayraktar, Harun, 11, 48, 76
Bazilevs, Yuri, 11, 19, 20, 24, 26, 38, 42, 43
Becker, Aaron, 24
Becker, Christian, 61
Becker, Richard, 54
Beckermann, Christoph, 29
Behbahani, Mehdi, 60
Behr, Marek, 12, 60
Beirao da Veiga, Lourenco, 24, 40
Belinha, Jorge, 24
Bell, John, 23
Bellizzi, Sergio, 18
Bellon, Pascal, 75
Belsky, Vladimir, 11, 48
Belytschko, Ted, 10, 11, 29, 31, 37, 38, 49, 70, 75
Ben Dhia, Hachmi, 11, 22
Benedict, Brandy, 45
Benedikt, Bartlomiej, 64
Bennett, Raymond, 60
Benoit, Jean-Pierre, 43
Benson, David, 10, 64
Benvenuti, Elena, 42
Berke, Peter, 64
Berry, Gearoid, 62
Berzins, Martin, 48
Besdo, Dieter, 48
Besdo, Silke, 48
Beuchler, Sven, 26
Bhattacharya, Amitabh, 21
Bhattacharya, Kaushik, 49
Bicanic, Nenad, 48
Bilbie, Gabriela, 43
Bilger, N., 62
Bindel, David, 40
Biros, George, 65
Bischoff, Manfred, 12, 24
Bischofs, Ilka, 61
Bishop, Joseph, 72
Biswas, Rupak, 56
Bittnar, Zdenek, 21, 49, 68
Blackard, Ben, 73
Blaise, Sébastien, 28
Blankenhorn, Gunther, 66
Blatman, Geraud, 46
Bletzinger, Kai-Uwe, 24, 63
Blittenthall, David, 42
Bloomfield, Max, 64
Bluhm, Joachim, 43
Bobaru, Florin, 39, 57, 77
Bober, Waldemar, 20
Boerner, Eiris, 45
Boffi, Daniele, 26, 27
Boggs, Paul, 28, 57
Bolander, John, 11, 21, 36
Bonne, Ulrich, 62
Bonnet, Marc, 46, 68
Bordas, Stephane, 37
Borden, Mike, 63
Borja, Ronaldo, 10, 58
Borovinsek, Matej, 61, 66
Bose, Kingshuk, 13, 31
Botkin Mark, 20, 30
Bottasso, Carlo L., 62
Boulanger, Pierre, 24
Bourinet, Jean-Marc, 46
Bout, Adrie, 23
Boyce, Mary C, 39
Braess, Dietrich, 44
Braeunig, Jean-Philippe, 19
Braiman, Yehuda, 41
Brancherie, Delphine, 49
Branets, Larisa, 63
Brank, Bostjan, 42
Brannon, Rebecca, 10, 19
Brasher, Nathan, 20, 38
Breitenfeld, Michael, 76
Brekelmans, W.A.M., 56
Brenner, Susanne, 38
Brewer, Michael, 63
Brezzi, Franco, 23
Brigham, John, 28, 62, 73
Brignone, Massimo, 67
Brinson, Catherine, 29
Brito Jr., Eduardo, 64
Brown, Anothony, 28
Brown, Jim, 71
Browne, James, 37
Bruinsma, Robijn, 49
Bruno, Oscar, 19
Brunssen, Stephan, 73
Bryant, Zev, 39
Buckley, Jenni M., 10, 71
Buehler, Markus, 61
Buffa, Annalisa, 24
Bunya, Shintaro, 45, 55, 60
Burczynski, Tadeusz, 12, 62
Burla, Ravi, 57
Burman, Erik, 22
Buscaglia, Gustavo, 50
Bush, Mark, 47
Butcher, Jason, 62

Buttlar, William, 11, 36, 46
Butz, Alexander, 28
Buyuk, Murat, 31, 66
Cacchione, Fabrizio, 78
Cacho, Fernando, 56
Cai, Wei, 46, 67
Cai, Xiao-Chuan, 24, 28
Calderini, Chiara, 73
Cale, Tim, 64
Callari, Carlo, 61
Calo, Victor M., 19, 20, 24, 26, 30, 38
Cammarata, Robert, 54
Campello, Eduardo M. B., 24, 29, 37
Capiez-Lernout, Evangeline, 28
Caporale, Andrea, 58
Cardoso, Rui P.R., 18
Carey, Graham, 31, 37, 45, 63
Carle, Steven, 18
Carnes, Brian, 50, 55
Caro, Alfredo, 75
Carol, Ignacio, 13, 26
Carpenter, Dana, 47
Carson, James, 48
Carter, Bruce, 59
Carter, Dennis, 47
Casolo, Siro, 77
Castro, Carlos, 45
Cavalagli, Nicola, 61
Caylak, Ismail, 23
Cebral, Juan, 48
Celentano, Diego, 23, 25
Celes, Waldemar, 41
Celiker, Fatih, 27
Cervone, Antonio, 76
Chadwick, Richard, 31
Chaillat, Stéphanie, 68
Chan, Eduardo, 50
Chan, Youn-Sha, 73
Chandran, Krishnan B., 66
Chandraseker, Karthick, 41
Chandrupatla, Tirupathi, 28
Chang, Chia-Ming, 44
Chang, Henry, 21
Chang, Hsi-Hung, 25
Chang, Ivy, 18
Chang, Sung-Pil, 55
Changjun, He, 27
Chantrasmi, Tonkid, 54
Chapelle, Dominique, 44
Charles, Yann, 36
Charmpis, Dimos C., 12, 70
Chawla, Gaurav, 41
Chee, Chin Yi, 23
Chen, C. S. David, 60
Chen, Chien-Chung, 22
Chen, J. S., 11, 21, 24, 26, 31, 39, 59, 73
Chen, Jianbing, 41
Chen, Jiaqin, 22, 29
Chen, Lei, 72
Chen, Shun-Chuan, 39
Chen, Wayne, 10, 39, 60
Chen, Xiaolin, 28
Chen, Youping, 44, 77
Chen, Yuanguo, 36
Chen, Yuguang, 28
Chen, Zhengzheng, 75
Cheng, Gengdong, 20
Cheng, Zhao, 62
Cheng, Zhong, 78
Chennimalai Kumar, Natarajan, 56
Cherkaev, Andrej, 30, 64
Cherkaev, Elena, 59
Chernikov, Andrey, 24
Chevalier, Jerome, 36
Chevaugeon, Nicolas, 57
Chi, Sheng-Wei, 31
Chiam, Keng Hwee, 49
Chiaruttini, Vincent, 72
Chiluveru, Sudhir, 42
Chin, Chee, 71, 77
Chinesta, Francisco, 11, 22
Chirputkar, Shardool, 70
Chiu, In-Shiu, 48
Cho, Chang-Geun, 55
Cho, Choong-Jae, 47
Cho, Jin-Rae, 13, 28, 66
Cho, Maenghyo, 73
Cho, Seonho, 29
Cho, Seung-Ho, 18, 23
Choi, In-Su, 18
Choi, Jaehwan, 59, 73
Choi, Jinbok, 73
Choi, Joo-Hyoung, 66
Choi, Yeol, 64
Chong, Ken P., 20
Chopp, David, 57
Chorin, Alexandre, 36
Choudhry, Sanjay, 11, 18, 23
Chowdhury, Mostafiz, 73
Chrisochoides, Nikos, 24
Chrispell, John, 77
Christ, Daniel, 29
Chronister, Eric, 25
Chu, Kevin, 70
Chuang, Yao-Li, 18
Chudinovych, Igor, 20
Chumakov, Sergei, 21
Chung Peter W., 20
Chung, Jae-Hyun, 61
Chung, Lan, 18, 23
Chung, Peter, 12, 36, 46, 74
Ciancio, Daniela, 13, 26
Ciesielski, Mariusz, 37
Ciobanu, Cristian, 36
Citto, Carlo, 73
Ciuciulkiene, Nijole, 75
Clancy, Thomas, 28
Clark, Brett, 58
Clayton, John, 36
Clouteau, Didier, 23, 46, 56
Cluni, Federico, 61
Cochelin, Bruno, 46
Codina, Ramon, 26
Coelho, Lucia, 41
Coelho, Marcelo, 40
Coenen, Erica, 60
Coffignal, Gérard, 30
Cohen, Elaine, 37
Cohen, Robert E, 39
Collier, Nathaniel, 78
Collins, Brett, 56
Collis, S. Scott, 20
Combescure, Alain, 19
Comblen, Richard, 28

Constanda, Christian, 12, 20
Constantine, Paul, 46
Cook, Benjamin, 72
Copps, Kevin, 55
Corigliano, Alberto, 10, 78
Correa, Maicon Ribeiro, 65
Correia, Miguel, 56
Corsini, Alessandro, 20
Cortial, Julien, 19
Costa, Kevin, 61
Costanzo, Francesco, 44, 58, 71
Cottereau, Regis, 23
Cottrell, J. Austin, 29, 30
Court, Germain, 60
Coutinho, Alvaro, 24, 45
Coyle, Joe, 67
Cranford, Ted, 25
Crawford, Neil, 71
Cristini, Vittorio, 18, 37
Crivelli, Luis, 48
Crouch, Steven L., 25, 58
Cruchaga, Marcela, 23, 25
Cruz-Leon, Gloria, 37
Cueto, Elias, 22
Cuitino, Alberto, 58
Culp, Murl, 27
Cummings, Peter, 41
Curtin, William, 26
Czarnota, Christophe, 27
da Silva, Carlos, 41
Dafalias, Yannis, 62
Dalbey, Keith, 70
Dambakizi, Franck, 54
Damkilde, Lars, 22
Danczyk, Josh, 18
Danek, Alois, 18, 48
Danielson, K., 49, 73
Dao, Ming, 39
Darve, Eric, 44, 75
Das, Kaushik, 31
Das, Sonjoy, 18
Dascalu, Cristian, 43
Dave, Eshan V., 36, 46
Davis, Tim, 28
Davy, Dwight, 43
Dawson, Clint, 11, 23, 45, 55, 60, 72
Daxner, Thomas, 19
de Borst, Rene, 65
de Miranda, Stefano, 45
De Roeck, Guido, 18
De, Suvranu, 10, 13, 19, 27, 57
Decuzzi, Paolo, 38
Dede, Ercan, 62
DeGeer, Duane, 78
Degrande, Geert, 47, 67
Degrauwe, Daan, 18
Deguchi, Shinji, 45
Del Pin, Facundo, 74
Del Vecchio, Andrea, 46
Delaplace, Arnaud, 71
Deleersnijder, Eric, 28
Delp, Scott, 39, 41
Delph, Terry, 21
Demarco, Dolores, 30
Demkowicz, Leszek, 13, 26, 42, 44, 54, 71
Demlow, Alan, 78
Denda, Mitsunori, 12, 63
Denzer, Ralf, 43
Derveaux, Gregoire, 44
Deryugin, Yevgenii, 28
Desbrun, Mathieu, 49
Desceliers, Christophe, 59
Deschamps, Marc, 30
Deshpande, Kedar, 71
DesJardin, Paul, 45, 76
Desmorat, Rodrigue, 71
Deü, Jean-François, 68
Devloo, Philippe, 13, 30
Dey, Saikat, 11, 19
Dhaher, Yasin, 21
Dhanasekar, Manicka, 79
Di Martino, Elena, 38
Diaby, Adama, 63
Diana Doina, Tenea, 67
DiCarlo, Antonio, 12, 38, 44
Diehl, Ted, 44
Dietrich, Joel, 55
Diez, Pedro, 78
Diller, Kenneth, 37
Dimitriadis, Emilios, 31
Dimnet, Eric, 74
Dinar, Tarig, 29, 50
Ding, Zhongman, 32
Dinis, Lucia, 24
Diniz dos Santos, Nuno, 58
Dixit, Parag, 64
Djellouli, Rabia, 47
Doblare, Manuel, 43, 44
Dodds Jr., Robert H., 41
Doghri, Issam, 55, 62
Dohrmann, Clark, 25, 76
Dolbow, J., 13, 25, 44, 47, 48, 59
Domino, Stefan, 50
Dong, Shoubin, 48
Dong, Steven, 31
Doostan, Alireza, 46, 54
Doré, Guy, 46
Dorfmann, A. Luis, 31
Dostal, Zdenek, 20, 28, 63
Doxsee Jr., Tad, 50
Du, Yan, 72
Duarte, A., 3, 13, 21, 29, 37, 42, 78
Dub, Francois-Xavier, 30
Ducasse, Eric, 30
Duddukuri, Sri Ramya, 36
Duenas, Terrisa, 59
Duester, Alexander, 30, 55
Dumbre, Abhijit, 65
Dunbar, Matt, 48
Durbin, Paul, 31
Dureisseix, David, 22
Durlofsky, Louis, 28
Dutko, Martin, 28
Dutra do Carmo, Eduardo, 76
Duysens, Jacques, 29, 43
Dvorkin, Eduardo, 45, 78
Dyadechko, Vadim, 19
Earmme, Youn Young, 56
Eberhardsteiner, Josef, 41
Ebrahimi, Davoud, 62
Edgerton, Reggie, 31
Eguzkitza, Beatriz, 79

Einstein, Daniel, 48, 55, 68
El-Awady, Jaafar, 70
Elber, Ron, 37
Elias, Renato, 24
Elkhodja, Nadia, 22
Elling, Timothy, 19
Elliott, Noah, 24
Elsayed, Tamer, 22
El-Zehiry, Noha, 47
Enakoutsa, Koffi, 77
Engelbrecht, Jüri, 59
Eom, Jae-Gun, 18
Epstein, Marcelo, 43
Erickson, David, 46
Erickson, Jeff, 63
Erturk, Alper, 37
Escobar, José M., 79
Escobedo, Jesus, 45
Eslinger, Owen, 68
Espinosa, Horacio, 10
Estacio, Kemelli, 31
Estevez, Rafael, 36
Etse, Guillermo, 21, 56
Evangelista Junior, Francisco, 46
Evans, Denis, 41
Evans, John, 19
Evans, Mike, 27
Fagerström, Martin, 61
Fahrenthold, Eric, 43
Falk, Richard, 20, 41
Fang, Fangxin, 65
Fang, Hongbing, 30, 65
Farhat, Charbel, 11, 19, 29, 50, 68, 70, 76
Farkas, Diana, 28
Farkas, Laszlo, 41
Farthing, Matthew, 12, 72, 77
Fatemi, Mostafa, 62
Fawzi, Nicolas Lux, 56
Fechner, Thomas, 47
Feijoo, Gonzalo, 11, 67
Felippa, Carlos A., 13, 18, 22, 54
Feng, Baofeng, 73
Feng, Yusheng, 13, 42
Feraboli, Paolo, 76
Ferencz, Robert, 12, 50
Fernandez, Charles, 59
Fernandez, Jose R., 54
Fernandez, Miguel Angel, 22, 27
Fernandez-Baqueiro, Luis, 66
Fernando, Honorio, 30
Ferrara, Anna, 56
Ferrari, Mauro, 38
Ferreira Lins, Erb, 18
Feucht, Markus, 60
Feyel, Frederic, 72
Figueroa, Carlos Alberto, 38, 48, 49, 55
Filippou, Filip C., 66
Finette, Steven, 18
Finkel, Steven, 18
Firl, Matthias, 24
Fish, Jacob, 10, 13, 24, 54, 60, 66, 70, 75, 77
Fisher, Aaron, 24, 64
Fisher, Quentin, 28
Flaherty, Joseph, 79
Flath, H. Pearl, 70
Flatscher, Thomas, 19
Fletcher, Daniel, 44
Fleury, Claude, 20
Fleury, Raphael, 25
Florek, Jan, 20
Fogli, Michel, 46
Fong, William, 44
Fontaine, Eléanor, 40
Foo, Jasmine, 75
Ford, Chris, 47
Forti, Tiago, 30
Fortin, Jerome, 54, 72
Fossum, Arlo, 19
Fouchal, Fazia, 67
Foulk III, James, 24, 78
Fox, David, 44
Francois, Manuel, 23
Francois, Marianne, 19
François, Stijn, 47, 67
Frangi, Attilio, 67
FrantzDale, Benjamin, 56
Fraternali, Fernando, 22, 38
Freund, Jonathan, 36, 60
Frey, Dan D., 71
Freytag, Michael, 29, 39
Frezzotti, Aldo, 67
Fries, Thomas-Peter, 31
Fringer, Oliver, 55
Fuentes, David, 37, 42
Fukuta, Yuichi, 62
Furukawa, Tomonari, 30, 71
Furuta, Hitoshi, 32, 38
Füssl, Josef, 41
Gagliardini, Laurent, 59
Gaidos, J., 39
Gal, Erez, 60
Gall, Ken, 21, 26
Ganapathysubramanian, Baskar, 59
Ganapathysubramanian, Shankar, 60
Garcia, Manuel, 24
García-Aznar, Jose Manuel, 43, 44
Garikipati, Krishna, 10, 45, 48
Gartling, David, 25
Garvin, Justin, 71
Garzón-Alvarado, Diego A, 44
Gasser, T. Christian, 42, 56
Gassner, Gregor, 45
Gastaldi, Lucia, 27
Gaston, Derek, 55, 63
Gates, Mark, 44
Gatouillat, Sébastien, 62
Gavini, Vikram, 49
Gay, Mickael, 60, 65
Gazonas, George, 31
Gee, Michael, 22, 25
Gee, Richard, 64
Geers, M.G.D., 56
Geers, Marc G.D., 20, 49, 60, 78
Geltmacher, Andrew, 42
Gentil, Fernanda, 42
Georgescu, Serban, 48
Gerard, J.S., 62
Gerbeau, Jean Frederic, 27, 58
Gerritsen, Margot, 55
Gerstenberger, Axel, 63

Geubelle, Philippe, 29, 36, 50, 56, 64, 76
Geuzaine, Christophe, 74
Geuzaine, Philippe, 45
Ghanem, Roger, 10, 18, 23, 41, 59
Gharebaghi, Ahmad Reza, 78
Ghattas, Omar, 56, 70
Ghisi, Aldo, 67, 78
Ghomeshi, Shahin, 78
Ghoniem, Nasr M., 28, 59, 70, 75
Ghosh, Debraj, 70
Ghosh, Somnath, 11, 44, 59, 64, 65
Gianzero, Stan, 42
Gibelli, Livio, 67
Gilbertson, Lars, 47
Gillette, Andrew, 47
Gioffrè, Massimiliano, 29
Gitiforouz, Anahita, 38
Givoli, Dan, 13, 71
Gloria, Antoine, 27
Gnecco, Enrico, 75
Goenzen, Sevan, 62
Gohnert, Mitchell, 42
Góis, Wesley, 47
Gokhale, Nachiket H., 62
Golovaty, Dmitry, 11, 23
Gomaa, Said, 47
Gomez, Hector, 24
Gonella, Stefano, 65
Gong, Yaoqing, 77
Gonzalez, Jose A., 68
Gopalakrishnan, Jay, 26
Gopinath, Arvind, 45
Gordeliy, Elizaveta, 25
Gordon, Peter, 21
Gorman, Gerard, 65
Gosselet, Pierre, 19, 22
Goswami, Samrat, 39, 43, 44, 47
Govender, Indresan, 72
Goyal, Sanjay, 36
Gracie, Robert, 29, 31, 70
Graham-Brady, Lori, 29, 70, 76
Grande, Ernesto, 58
Gravemeier, Volker, 25
Gravouil, Anthony, 37
Gray, Gary L., 58
Gray, Len, 54
Gray, Leonard, 63
Greenleaf, James, 62
Grégoire, David, 19
Greiner, Ken, 58
Grigoriu, Mircea, 28, 29, 61
Grimal, Quentin, 59
Grimes, Roger, 48
Grinberg, Leopold, 56
Grinfeld, M, 36
Grinfeld, Michael, 37
Grinfeld, Pavel, 37
Grosh, Karl, 48
Gross, Dietmar, 38
Gross, Laura K., 18, 23
Gruttmann, Friedrich, 19
Guan, Pai-Chen, 73
Guasch, Oriol, 26
Gubanov, Oleg I., 58
Guccione, Julius, 49
Guddati, Murthy, 13
Gueloget, Bruno, 23
Guerses, Ercan, 38
Guest, James K., 25
Guevara, Jr., Nestor, 41
Guggenberger, Werner, 60
Guilak, Farshid, 27, 45
Guilkey, James, 48
Guillormini, Pierre, 22
Guillou, Anna, 38
Guissi, Guillaume, 46
Gullerud, Arne, 60
Gunney, Brian, 24
Guo, Xiang, 26
Guo, Yong, 10, 26, 31
Guoy, Damrong, 42, 63
Gupta, Atul, 76
Gupta, Rahul, 22
Gusella, Vittorio, 61
Ha, Gee Joo, 55
Ha, Seung-Hyun, 29
Ha, Sung Kook, 55
Haber, Robert, 22, 24, 39, 66, 72
Hadjiconstantinou, Nicolas, 31
Haegeman, Wim, 67
Hagen, Scott, 60
Hager, Corinna, 59
Hagihara, Seiya, 39
Hagstrom, Thomas, 71
Haiat, Guillaume, 59
Haider, Mansoor, 27, 45
Haimes, Robert, 58
Hain, Michael, 76
Hakobyan, Yeranuhi, 61
Hakula, Harri, 24, 30
Hales, Jason, 45
Hall, Timothy J., 62
Ham, David, 65
Ham, Frank, 50, 60
Hamon, Ann-Lenaig, 49
Hamoui, Anas, 45
Han, Jong, 73
Han, Kyu-Taek, 23
Han, Sang-Woo, 36
Hannon, James, 54
Hannot, Stephan, 58
Hao, Su, 46
Hartmann, Dietrich, 70
Hartmann, Friedel, 59
Hartmann, Stefan, 36, 55, 73
Harvey, John, 46
Hashemi, Alidad, 67
Hashimoto, Gaku, 42
Haslinger, Jaroslav, 20
Hassan, Noha, 24
Hassing, Peter, 30, 65
Haufe, Andre, 60
Havstad, Mark, 50
Hawkins, Andrea, 42
Hayashi, Takuji, 63
Hazle, John, 37
He, Kejing, 48
Head-Gordon, Teresa, 56
Heath, Michael, 44
Hebbal, Mallappa, 45, 50
Heinstein, Martin, 45, 60
Heisserer, Uli, 55
Heltai, Luca, 27, 44
Hemez, Francois, 60
Henz, Brian, 59
Herr, Hugh, 40

Herzog, Walter, 43
Hettich, Thomas, 38
Hidajat, Realino, 71
Hilchenbach, Frederic, 38
Hildebrand, John, 25
Hill, Judy, 70
Hille, Thomas, 42
Hillewaert, Koen, 45
Himpel, Grieta, 43
Hines, Amanda, 68
Hiptmair, Ralf, 31
Hirose, Takeshi, 23
Hjelmstad, Keith, 45
Hoc, Thierry, 61
Hoitink, Andrew, 54
Ho-Kim, Nam, 22
Holst, Michael, 37
Holtzman, Ran, 48
Holzapfel, Gerhard A., 10, 56
Hong, Wonhwa, 64
Hooper, Russell, 50
Horak, David, 28
Horiuchi, Toshiaki, 42
Hornung, Richard D., 54
Horstemeyer, Mark, 31
Hossain, Shaolie, 38
Hou, Wenyi, 59
Houzeaux, Guillaume, 79
Howard, William E., 70
Howington, Stacy, 72
Hu, Chao, 59
Hu, H. Y., 21
Hu, Peng, 32
Hu, Qiyang, 28
Hu, W., 10, 21, 24
Hu, Wenqing, 60
Hu, Xiao-Zhi, 47
Huang, C. W., 60
Huang, Hanchen, 12, 36
Huang, Rui, 42
Huang, Yuli, 73
Huang, Yun, 42
Huerta, Antonio, 78
Huespe, Alfredo E., 38
Hughes, Thomas J.R., 11, 19, 20, 24, 26, 29, 30, 38, 43, 65
Huijin, Li, 27
Hulbert, Greg, 11, 54, 62, 78
Humphrey, J. D., 38, 43, 55
Hund, Andrea, 38
Hutchinson, John, 27
Hwang, Feng-Nan, 28
Hwang, Jae-Seung, 18
Hwang, Wonmuk, 39
Iaccarino, Gianluca, 46, 54, 60
Ibrahimbegovic, Adnan, 49
Idelsohn, Sergio, 12, 18, 43
Idesman, Alexander, 11, 25
Iglesias, Marco A., 23
Il Chul, Ahn, 76
Im, Seyoung, 12, 26, 56, 57, 70
Imatani, Shoji, 48
Imbimbo, Maura, 58
Ine, Tatsuhiko, 47
Ingebrigtsen, Tor, 43
Inglis, Helen, 64
Ingraffea, Anthony, 79
Ino, Masaki, 61
Inoue, Yasuhiro, 61
Irina, Goryacheva, 20
Isaksen, Jørgen, 43
Isfahani, Amir, 60
Ishii, Tateki, 57
Ishikawa, Yasuaki, 26
Isnard, Olivier, 43
Issaev, Denis, 22
Itoh, Keishi, 47
Ivorra, Salvador, 39
Iwamoto, Nancy, 62
Iyer, Kaushik A., 19
Jabareen, Mahmood, 40
Jackson, Thomas, 29
Jacobs, Christopher, 56
Jacques, Nicolas, 27
Jäger, Philippe, 57
Jaiman, Rajeev, 50
Jameson, Antony, 45
Jammes, Matthieu, 58
Jansen, Kenneth, 31, 56, 65
Jansen, Kenneth E., 11, 24, 31, 48
Janusevskis, Janis, 30
Janushevskis, Alexander, 30
Jefferson, David R., 54
Jelinek, Bohumir, 31
Jemcov, Aleksandar, 48
Jenkins, Lea, 72, 77
Jeong, Chanseok, 67
Jeraj, Robert, 27
Jeremic, Boris, 10, 41, 62
Jerusalem, Antoine, 73
Jha, Akhilesh, 59
Jha, Birendra, 62
Jhurani, Chetan, 54
Jia, Jun, 77
Jia, Xin, 65
Jiang, Hanqing, 12, 54
Jiang, Yi, 48
Jiao, Xiangmin, 42, 50
Jin, Fang, 18
Jirousek, Ondrej, 77
Jo, Ji-Seong, 47
Johansson, Hakan, 23
Johnson, Duane, 66
Johnson, George, 78
Johnson, Jeffrey, 39
Johnson, Scott, 11, 72, 77
Jommi, Cristina, 49
Jones, Reese, 10, 64, 72
Jorabchi, Kavous, 18, 27
Jorge, Renato Natal, 11, 24
Joseph, Sony, 46
Joun, ManSoo, 18, 68
Jox, Stefan, 61
Joyner, James T., 23
Ju, J. Woody, 10, 49, 55
Juanes, Ruben, 23, 30, 62
Juarez Luna, Gelacio, 38, 44, 57
Jun, Sukky, 11, 44, 57
Jung, Chan-Woo, 59
Jung, Hyung-Jo, 47

Jung, Kwangsub, 73
Jung, Youngjean, 44
Kadadevaramath, Jagadish, 45
Kadry, Seifedine, 12
Kajiwara, Koichi, 47
Kale, Laxmikant, 24
Kallivokas, Loukas, 67
Kalyanam, Sujatha, 49
Kambouchev, Nayden, 31
Kaminski, Marcin, 11, 56
Kan, Steve, 31, 66
Kaneshige, John, 62
Kang, Jiwon, 56
Kang, Keonwook, 46
Kanso, Eva, 11, 49
Kapania, Rakesh, 31, 71
Kaplan, Ted, 54
Kaplan, Theodore, 63
Karg, Christian, 67
Karl, Lutz, 47
Karniadakis, George, 44, 56, 75
Kashiyama, Kazuo, 13, 60
Kasimzade, Azer, 70
Kaspersen, Jon Harald, 43
Katori, Hiroaki, 74
Katsis, Christos, 50
Kavuri, Hariharanath, 73
Kawahara, Mutsuto, 18, 27, 57, 65
Kawai, Hiroshi, 42
Kawai, Nobuyoshi, 60
KC, Amit, 73
Keaveny, Tony, 76
Keer, Leon, 23
Kees, Chris, 12, 72, 77
Kegl, Marko, 42
Kellermann, David, 30, 71
Kelley, Tim, 72
Kelly, Alex, 25
Kelly, Sinead, 65
Kendall, Michael, 28
Kerur, Shravankumar, 50
Kesari, Haneesh, 67
Khavrutskii, Ilja, 57
Khazanovich, Lev, 41
Khor, Eng Hui, 30
Kiefer, Bjoern, 20
Kielhorn, Lars, 58
Kikuchi, Fumio, 38
Kikuchi, Masanori, 61, 63, 65
Kikuchi, Noboru, 40
Kim, Boung-Yong, 59
Kim, Byunghun, 73
Kim, Changwan, 71
Kim, Chun Il, 20
Kim, Dae-Jin, 21, 37
Kim, Dae-Min, 59
Kim, Dong-Jo, 57
Kim, Eunjung, 27
Kim, Hack-Jin, 23
Kim, Han Sung, 59, 73
Kim, Hongjin, 47, 59
Kim, Hong-Tae, 18
Kim, Hyo-Jin, 57
Kim, Hyun Jin, 48
Kim, Hyun-Jung, 36
Kim, In-Ho, 75
Kim, Jee-Sang, 64
Kim, Jeong-Ho, 11, 73
Kim, Ji Hoon, 57
Kim, Jin Hee, 61
Kim, Juwhan, 64
Kim, Ki-Du, 18
Kim, Kunhwi, 64
Kim, Seung Jo, 61, 65
Kim, Sung Youb, 44, 56, 57
Kim, Taehyung, 31
Kim, Whajung, 36, 47, 59
Kim, Yun Yong, 55
Kimmer, Chris, 28, 55
Kioussis, N., 75
Kirby, Mike, 48
Kirk, Benjamin, 63
Klein, Franziska, 61
Klein, Patrick, 39, 57, 78
Klinkel, Sven, 19, 28
Klug, William, 45, 49
Knap, Jaroslaw, 36, 54, 75
Kobayashi, Kaoru, 25
Kobayashi, Toshio, 55
Kocabiyik, Serpil, 58
Kochubey, Olexandr, 48, 74
Kodambaka, Suneel, 54
Kohn, Jonathan, 56
Koike, Akihiro, 74
Koishi, Masataka, 21
Kojic, Milos, 38
Kojima, Tomoyuki, 61
Koketsu, Kazuki, 68
Kokubo, Kyohei, 38
Kolke, Andreas, 63
Koniges, Alice, 24, 64
Konyukhov, Alexander, 20
Korchagin, Vladimir, 48
Korelc, Joze, 23
Koshizuka, Seiichi, 43
Koslowski, Marisol, 73
Kostelich, Eric, 57
Koumoutsakos, Petros, 54
Kouris, Demitris, 44
Koutsourelakis, Phaedon-Stelios, 70
Kouznetsova, Varvara, 20, 60
Kovacs, Adam, 66
Kovacs, Andras, 66
Koyama, Toshiyuki, 49
Koynov, Athanas, 58
Koziara, Tomasz, 48
Kozubek, Tomas, 20
Kraczek, Brent, 66
Kraft, Reuben, 71
Kraigsley, Alison, 18
Kramer, Stephan, 65
Krasnochtchekov, Pavel, 75
Krause, Roland, 59
Krause, Rolf, 59
Krenk, Steen, 54
Krishnakumar, Kalmanje, 62
Krishnan, Sreedevi, 60, 66
Kristensen, Anders S., 22
Krosche, Martin, 50
Kruisova, Alena, 30
Krutka, Holly, 37
Krysl, Petr, 25
Kubatko, Ethan, 45, 55, 60
Kucera, Radek, 20
Kucerova, Anna, 49
Kucharik, Milan, 24

Kudou, Akihiro, 74
Kuettler, Ulrich, 22, 63
Kuhl, Ellen, 10, 13, 43, 56, 57
Kulkarni, Ambarish, 39
Kulkarni, Deepak, 60
Kulkarni, Mohan, 36
Kulkarni, Nilesh, 62
Kulkarni, Yashashree, 36, 62
Kumar, Abhishek, 21
Kumar, Ashok V, 57
Kumar, Mukul, 29
Kunnath, Sashi, 13, 47, 63
Kuo, S.R., 60
Kuprat, Andrew, 48, 68
Kupzok, Alexander, 63
Kuroda, Mitsutoshi, 54
Kurtz, Jason, 44
Kurumatani, Mao, 37
Kus, Waclaw, 62
Kushner, Alan, 73
Kusnezov, Dimitri, 18
Kvamsdal, Trond, 10, 43
Kwak, Byung Man, 27
Kwak, H.G., 11, 36
Kwon, Hyun-Wook, 36, 55
Kwon, Ronald, 56
Kwon, Sungjin, 56
Kwon, Young-Doo, 36, 55
Kyoya, Takashi, 57
La Hargue, Jean-Pierre, 29
Labbe, Fernando, 46
Labelle, Francois, 74
Labibzadeh, Mojtaba, 64
Lacevic, Naida, 64
Lackner, Roman, 41
Ladeveze, Pierre, 9, 10, 17, 71, 76
Lagaros, Nikos, 28
Laggner, Peter, 56
Lagomarsino, Sergio, 73
Lahey, Richard, 31
Lai, J. W., 60
Lai, Tan Lei, 49
Lam, Dennis, 21
Lam, Kin, 55
LaMattina, Bruce, 59
Lambros, John, 73
Landa, Michal, 30
Langlois, Steve, 29
Larbi, Walid, 68
Larsson, Fredrik, 23, 32
Larsson, Ragnar, 61
Larue, Arnaud, 30
Laschet, Gottfried, 49
Lasko, Galina, 28
Laursen, Tod, 44, 59
Lazarov, Raytcho, 22
Le Tallec, Patrick, 10, 78
Le, Phong, 26
Le, Phuong, 31
Leach, Austin, 21, 26
Lebon, Frédéric, 67
Ledger, Paul, 38
Lee, Chin-Long, 66
Lee, Dong-Wook, 66
Lee, H.K., 11, 55
Lee, Hae-Jin, 32
Lee, Hong-Woo, 28
Lee, Hyungyil, 31
Lee, In-Ho, 57
Lee, J. K, 59, 73
Lee, Jae-Hoon, 66
Lee, Jaesung, 26
Lee, James, 44, 77
Lee, Jun Ho, 26
Lee, Jung-Youn, 32
Lee, Kwang-Myong, 55
Lee, Lie-Quan, 74
Lee, Mincheol, 18, 68
Lee, Nak Kyu, 73
Lee, Sang-Ho, 11, 57
Lee, Sang-Hyun, 18, 23
Lee, Soobum, 27
Lee, Swoo-Heon, 36
Lee, Yoon Sup, 56
Lee, Youngmin, 56, 70
Leelavanichkul, Seubpong, 64
Legat, Vincent, 28, 50
Legay, Antoine, 63
Lehnert, Dirk, 61
Leiderman, Ricardo, 62
Leininger, Lara, 44
Leng, Yongsheng, 41
LePage, Kevin, 41
Lew, Adrian, 10, 27, 44, 50, 56, 67
Lewis, Alexis, 42
Lewis, Matthew, 64
Leyendecker, Sigrid, 49
Li, Aiqin, 66
Li, Fengyan, 38, 55
Li, Gang, 12, 28
Li, Jie, 41
Li, Ju, 11, 21, 39, 56
Li, Ke, 77
Li, Lan, 28
Li, Lixin, 59
Li, Qing, 40
Li, Renge, 66
Li, Shaofan, 11, 44
Li, Song, 75
Li, Xiangrong, 18
Li, Youhong, 75
Li, Zhongxue, 37
Li, Zi Cai, 21
Liao, Jung-Chi, 39, 41
Lieu, Thuan, 50
Lim, C.T., 61
Lim, Jae Hyuk, 26, 57
Lim, Jihoon, 64
Lim, Yun Mook, 64
Lin, Charlie, 46
Lin, Jeen-Shang, 47
Lin, Michael, 56
Lindemann, Jonas, 70, 75
Linder, Christian, 44, 46
Lindgren, Lars-Erik, 18
Linhard, Johannes, 24
Linzell, Daniel, 22
Lipton, Robert, 45
Lipton, Scott, 19
Liska, Richard, 24
Littlefield, David, 46
Littlewood, David, 44
Liu, Aiping, 66
Liu, Chengwen, 13, 28
Liu, Fushen, 58
Liu, G. R., 44
Liu, Geng, 73
Liu, Hedong, 65
Liu, Jane, 41
Liu, Ling, 20
Liu, Tianxiang, 73

Liu, Wing Kam, 10, 11, 54, 57, 61, 64, 66
Liu, Yaling, 61
Liu, Yijun, 12, 28, 63, 68
Liu, Yingjie, 60
Liu, Zhanke, 58, 74
Llorca, Javier, 75
Loehnert, Stefan, 29
Lohner, Rainald, 48, 68
Loktev, Alexey, 22
Lokteva, Irina, 22
Lombaert, Geert, 18, 47, 56
Long, Kevin, 57, 59
Long, Lyle, 22
López-Puente, Jorge, 67
Lörcher, Frieder, 45
Lorefice, Ricardo, 21
Lorong, Philippe, 30
Loth, Eric, 50
Lotz, Jeffrey C., 71
Loubere, Raphael, 12, 19
Loula, Abimael, 65, 76
Lovadina, Carlo, 24, 40
Love, Bryan, 41
Love, Edward, 25
Lowak, Michael, 60
Lu, Chun, 72
Lu, Hongsheng, 21, 26
Lu, Jia, 21, 26
Lu, Qiang, 75
Lu, Tzon-Tzer, 44
Lu, W. Y., 60
Lucas, Bob, 48
Luciano, Raimondo, 58
Luettich, Rick, 55
Luft, Brian, 37
Luo, Changsong, 76
Luo, Xiaonan, 56
Luo, Xiao-Qun, 20
Luo, XJ, 27
Luraghi, Fabio, 62
Lykotrafitis, George, 39
Lynch, Larry, 72
Lynn, Todd A., 46
Ma, Haitao, 59
Ma, Lin, 45, 49
Ma, Xiang, 75
Mackenzie-Helnwein, Peter, 48
Macri, Michael, 57
Madariaga, Raul, 23
Maduri, Rajesh, 71
Mahesh, Krishnan, 21
Mahin, Stephen, 73
Mahler, Walter, 39
Mahnken, Rolf, 12, 23
Mai-Duy, Nam, 26
Maier, Sabine, 75
Maigre, Hubert, 19
Maina, James, 41
Maiti, Spandan, 39
Maitre, Jean-François, 45
Majchrzak, Ewa, 73
Makino, Hiroyuki, 61
Man, Hau-Kit, 66
Manchiraju, Sivom, 44
Mang, Herbert, 12, 65
Mangiavacchi, Norberto, 31
Maniatty, Antoinette, 44
Manoussaki, Daphne, 31
Manservisi, Sandro, 12, 76
Mantovano, Luciano, 78
Marasteanu, Mihai, 41, 58
Marcal, Pedro, 66
Marchand, Estelle, 23
Marcilhac, Marine, 60
Margolis, Stephen, 11, 18, 57
Marhadika, M., 18
Marian, Jaime, 60, 61, 75
Mariani, Stefano, 78
Marini, L. Donatella, 23
Marjanishvili, Shalva, 39
Marks, Nigel, 75
Marsden, Jerrold E., 49
Martha, Luiz Fernando, 32, 79
Martinez, Enrique, 61
Martinez, Xavier, 76
Martinez-Villalpando, Ernesto C., 40
Martins, J., 10, 44
Martins, Marcos, 24
Maruszewski, Joseph P., 48
Marzougui, Dhafer, 66
Marzouk, Youssef, 28, 36
Mascarenhas, Luísa, 40, 45
Masia, Mark, 58
Masmoudi, Mohamed, 62
Massart, Thierry, 63, 64
Massimi, Paolo, 50
Masters, Nathan, 24, 67
Masud, Arif, 10, 30
Masuri, Siti, 54
Mata, Pablo, 67
Materna, Daniel, 48
Math, Vinay, 50
Matous, Karel, 29, 36, 44, 45, 56, 64
Matringe, Sebastien, 23
Matsuda, Tetsuya, 62
Matsui, Kazumi, 49, 57
Mattern, Steffen, 66
Matthies, Hermann G., 50
Matuszyk, Pawel, 44
Mavrokefalos, Anastassios, 39
Mazaheri, Karim, 67
Mazzag, Bori, 61
McBride, Andrew, 27, 36
McCammon, J. Andrew, 57
McDowell, Matt, 26
McGee, Shelly, 76
McGee, Wayne, 65
McGruer, Nicol E., 72
McLaughlin, Joyce R., 62
McVeigh, Cahal, 54, 57, 64, 66
Mediavilla, Jesus, 49
Medyanik, Sergey, 49
Meier, Holger, 56
Menichini, Filippo, 20
Menzel, Andreas, 43, 54
Mercatoris, Benoit, 63
Mercier, Sébastien, 27
Mergheim, Julia, 48
Meschke, Günther, 61
Mestreau, Eric, 68
Mettupalayam, Siva, 73
Meyer, Ernst, 75
Mi, Changwen, 44
Michaleris, Panagiotis, 32
Michler, Christian, 42
Miehe, Christian, 38

Mielke, Steven, 31
Mignolet, Marc, 54
Miksis, Michael, 28
Milani, Abbas S., 71
Milani, Enrico, 79
Milani, Gabriele, 79
Milewski, Slawomir, 39
Miller, Gary, 79
Miller, Gregory R., 48
Miller, Michael, 31
Miller, Scott, 22
Minnebo, Hans, 57
Mintzer, Mark, 76
Miranda, Antonio, 79
Mironova, Larisa A., 58
Mitri, Farid, 62
Miyake, Hiroe, 68
Mizutani, Chihiro, 18
Mocanu, Marcelina, 49
Mochnacki, Bohdan, 37
Moens, David, 41
Moës, N., 31, 47, 57
Mofrad, Mohammad, 10, 45
Mogilevskaya, Sofia G., 25, 58
Mohr, Rouven, 54
Molari, Luisa, 45
Moleiro, Filipa, 41
Molinari, Alain, 27
Molinari, JF, 71
Monk, Joshua, 28
Montalva, Arturo, 39
Monteiro Azevedo, Nuno, 67
Monteiro, Marko, 42
Montenegro, Rafael, 79
Montero, Gustavo, 79
Monti, Giorgio, 63
Moon, Ji Joong, 65
Moon, JongKeun, 61
Moore, John A., 48
Moore, Peter, 78
Moorthy, Suresh, 31
Moran, Brian, 21, 61
Moreira, Maria, 18
Moreo, Pedro, 43
Morgan, Elise F., 62
Mori, Hideki, 56
Morris, Joseph, 11, 77
Mosalam, Khalid, 67
Moser, Robert, 21, 36
Mosler, Joern, 38
Mota Soares, Carlos, 41
Mota Soares, Cristovao, 41
Mota, Alejandro, 22, 60
Mseis, George, 2, 24
Mueller, Ralf, 38
Muench, Ingo, 49
Muenz, Thomas, 60
Mukherjee, Subrata, 41, 59
Mukudai, Yutaro, 61
Muntz, Sabine, 28
Munz, Claus-Dieter, 45
Murakami, Shigeyuki, 21
Myers, Donald, 24
Na, Seong-Won, 67
Na, Wookjin, 54
Nadler, Ben, 67
Nagashima, Toshio, 26
Nagtegaal, Joop, 44
Naili, Salah, 59
Nair, Kalyani, 27
Najm, Habib, 36
Nakajima, Shuji, 27
Nakamura, Gaku, 67
Nakata, Keisuke, 62
Nakatani, Akihiro, 12, 61
Nakatsu, Koichiro, 38
Nakayama, Yoshikazu, 56
Nakhle, Michel, 29
Napier, John, 74
Narayanan, Harish, 48
Narayanan, S., 47
Nardinocchi, Paola, 38
Navon, Ionel M, 57
Negri, Matteo, 38
Nelson-Owusu, Kofi, 67
Nemat-Nasser, Sia, 23
Néron, David, 22
Nerurkar, Nandan, 38
Nervi, Sebastian, 30
Newman, Christopher, 55
Nguyen, Giang, 21
Nguyen, Kien, 43
Nguyen, Thao, 76
Nicolai, Mike, 60
Niekamp, Rainer, 50
Niemi, Antti H., 29, 30
Nintcheu, Sylvain, 63
Nishimoto, Tetsuya, 21
Nistor, Victor, 19
Nobile, Fabio, 22, 43
Noble, David, 29, 44
Noels, Ludovic, 27, 39
Noguchi, H., 24, 39, 42, 54
Noh, Hyuk-Chun, 75
Noirfalise, Claudine, 46
Nonato, Luis Gustavo, 31
Norato, Julian, 25
Nordlund, Per, 23
Norouz Oliaei, Mohammad, 30
Nothwang, William, 36
Nouguier, Christophe, 43
Nugen, Fred, 42
Nuggehally, Mohan, 56, 77
Nukala, Phani, 66
Obara, Michitaro, 42
Oberai, Assad, 11, 26, 62, 73
Ober-Blöbaum, Sina, 49
Odegard, Gregory, 28
Oden, J. Tinsley, 11, 13, 37, 42, 61
Odunuga, Samson, 75
Ogata, Shigenobu, 56
Oh, Jae-Eung, 32
O'Hara, Patrick, 29
Ohayon, Roger, 10, 54, 68, 71
Ohno, Nobutada, 44
Ohtaki, Seiichi, 42
Ojima, Yasunori, 65
Okada, Hiroshi, 42, 57
Okazawa, Shigenobu, 65
Okuda, Hiroshi, 48, 56, 61
Okumura, Dai, 44
Olagnon, Christian, 36
Ølgaard, Kristian, 39
Oliver, Javier, 13, 38, 57
Oller, Sergio, 67, 76
Olson, Lorraine, 62

Olsson, Karl-Gunnar, 70
Olsson, Pierre, 70
Oñate, Eugenio, 12, 18, 20, 43, 47
O'Reilly, Oliver, 71
Orkisz, Janusz, 39
O'Rourke, Malachy, 65
Ortiz, Michael, 22, 36, 38, 49, 60, 62
Orvañanos, Teresa, 45
Orzechowski, Joe, 46
Osborn, John, 19
Oshima, Marie, 55
Oskay, Caglar, 55
Ostasevicius, Vytautas, 75
Ostoja-Starzewski, Martin, 11, 66
Oswald, Jay, 29, 31
Otani, Yoshihiro, 58
Ouaar, Amine, 31
Ould Bah, Hanani, 72
Overfelt, James, 45, 50
Owen, J. Michael, 39
Owen, Steven, 11, 58
Özüpek, Sebnem, 48
P. Tootkaboni, Mazdak, 70
Pacheco, Alejandro, 62
Paci, Jeffrey, 31
Paik, Seung Hoon, 65
Pain, Christopher, 65
Pal, Ghanshyam, 55
Pal, Siladitya, 39
Palacios, Francisco, 45
Palaniappan, Jayandran, 39
Palevicius, Arvydas, 75
Pan, Ernie, 12, 36, 46, 63, 74
Pan, Jan Wei, 30, 71
Pan, Jingzhe, 49
Pandolfi, Anna, 38, 49, 56
Panico, Michele, 29
Pantz, Olivier, 58
Pao, Chun-Wei, 46
Paolucci, Samual, 55
Paoluzzi, Alberto, 44
Papadopoulos, Panayiotis, 20, 65, 67, 76
Papadopoulos, Vissarion, 12, 70
Papadrakakis, Manolis, 12, 28, 29, 70
Papavassiliou, Dimitrios, 31, 37, 43
Papoulia, Katerina, 42, 61
Paraschivoiu, Marius, 78
Pardo, David, 10, 42
Pares, Nuria, 78
Park, Eun-Jae, 23
Park, Harold, 10, 12, 39, 57
Park, Jaegyun, 64
Park, Jang Ho, 64
Park, Jong Youn, 70
Park, K.-C., 22, 54, 68
Park, Kyoungsoo, 36, 41
Park, Sangmin, 47
Parker, David, 41
Parks, Michael, 64
Parrish, D. Michael, 60
Parsons, Dennis, 12, 50
Parvizian, Jamshid, 30
Pascale, Pierre, 46
Pask, John, 49
Paszynski, Maciej, 42, 44
Patelli, Edoardo, 36
Patra, Abani, 39, 56, 70
Patzak, Borek, 21
Patzek, Tadeusz, 48
Paul-Emile, Bernard, 45, 50
Paulino, Glaucio, 12, 27, 36, 41, 46, 73
Paz, Carmen, 41
Pebay, Philippe, 28
Pebrel, Julien, 22
Peerlings, Ron H.J., 49, 78
Pelissou, Céline, 67
Pellegrino, Richard, 76
Pellissetti, Manuel, 36
Pendurti, Srinivas, 57
Peraton, Daniel, 46
Pereira, Anderson, 32
Pereira, Jeronymo, 21, 42
Perez, Henry, 66
Perez, Maria Angeles, 43
Periaux, Jacques, 12, 62
Persson, Kent, 70
Perugia, Ilaria, 31
Peszynska, Malgorzata, 72
Peters, John, 62, 63, 72
Petersen, Robert, 58
Petersen, Steffen, 76
Peterson, John, 63
Peterson, Kara, 21
Petryk, Henryk, 20
Pettes, Michael, 39
Phan, Anh-Vu, 54
Phillips, Joel, 26
Phillips, Todd, 79
Piana, Michele, 67
Picu, Catlin, 77
Pierson, Kendall, 25
Piggott, Matthew, 65
Piltner, Reinhard, 59
Pimenta, Paulo M., 18, 24, 29, 37, 65
Pinho, Raquel, 56
Pinsky, Peter, 21, 29, 78
Pirzadeh, Shahyar, 24
Pissaloux, Edwige, 40
Pitkäranta, Juhani, 30, 37
Pitman, E. Bruce, 70
Pitt, Jonathan S., 71
Plamenevsky, Boris, 12, 55
Plesek, Jiri, 30
Plucinski, Mateusz, 58
Poldneff, Mike, 28
Polishko, Tetyana, 48
Pollard, David, 58
Polyakov, Mykola, 74
Pope, Scott, 72
Porfiri, Maurizio, 58
Porter, Vicki, 60
Potapenko, Stanislav, 12, 25
Powell, David, 2, 67
Powers, Joseph, 55
Pozharskii, Alexey, 55
Pozharskiy, Alexey, 55
Pradlwarter, Helmut, 41, 59
Prado, Ivodinko, 25

Prantil, Vincent C., 70
Preisig, Matthias, 62
Probst, Markus, 60
Proença, Sergio Persival, 47
Proppe, Carsten, 46, 62
Prudencio, Ernesto, 24
Prudhomme, Serge, 13, 32, 61
Puria, Sunil, 29
Puso, M., 24, 26
Putman, Christopher, 48
Pyatigorets, Andrey, 58
Qasim, Tarek, 47
Qian, Dong, 10, 49, 70, 72
Qian, Jing, 26
Qian, Xianghong, 57
Qidwai, M.A. Siddiq, 42
Quek, Siu Sin, 70
Quek, Yeong Loong, 49
Quint, Karsten, 36, 55
Rabczuk, Timon, 37
Rachowicz, Waldek, 13, 38
Radhakrishnan, Satish, 29
Radovitzky, Raul, 27, 31, 39, 42, 73
Raffo, Javier, 78
Raghu, Rashmi, 49
Ragulskis, Minvydas, 75
Rahman, Sharif, 73
Rajagopalan, Jagannathan, 46, 73
Rajasekharan, Ajaykumar, 68
Ramakkagari, Viswanath, 79
Ramalho, Jairo, 30
Ramasubramaniam, Ashwin, 36
Ramasubramanian, Ashok, 38
Ramesh, KT, 71
Ramm, Ekkehard, 10, 13, 38, 73
Rammerstorfer, Franz G., 19
Ramsey, James, 74
Ramsey, Will, 71
Randow, Charles, 31
Rang, Joachim, 50
Rangaswamy, Partha, 64
Rangelova, Marina, 78
Rank, Ernst, 30
Rannou, Johann, 37
Rao, Rekha, 29
Raoult, Annie, 19
Rashid, Mark, 29, 44, 46, 50
Ratcliffe, Mark, 49
Rattanadit, Kitti, 77
Raut, Shital, 43
Ray, Debabrata, 47
Ray, Tathagata, 58
Reali, Alessandro, 24, 29, 40
Reddy, CD, 72
Reddy, Daya, 27, 36
Reddy, J. N., 13, 18, 41, 54, 60, 65, 71
Red-Horse, John, 10, 23, 28
Reese, Garth, 76
Reese, Stefanie, 12, 29, 40
Regueiro, Richard, 10, 13, 58, 62, 77
Remacle, Jean-Francois, 28, 31, 45, 50, 74
Remmers, Joris, 20
Ren, Zoran, 61, 66
Renzi, Daniel, 62
Retama, Jaime, 38
Retford, Chris, 28
Reuter, Mark, 54
Rex, Stephan, 49
Rey, Christian, 19, 22
Rezgui, Ali, 45
Rhee, Richard, 18
Rhodes, Mike, 62
Riahi, Mohammad, 27
Richards, Michael S., 62
Ricken, Tim, 43
Rickman, Jeffery, 21
Rim, Jee, 62
Rispoli, Franco, 20
Ritchie, Robert, 78
Rivas, Carlos, 62, 73
Riviere, Beatrice, 31
Rixen, Daniel, 19, 32, 58, 62
Rizzi, Nicola L., 79
Rochinha, Fernando, 18, 76
Rochus, Véronique, 58, 62
Rodic, Tomaz, 31
Rodríguez, Eduardo, 79
Rodriguez, Saul, 24
Rodriguez-Romo, Suemi, 37
Roecker, Steven W., 62
Roesler, Jeffery, 36, 46
Roller, Sabine, 32
Romero de la Osa, Marc, 36
Romero, Ignacio, 75
Romkes, Albert, 13, 60, 65, 71
Romner, Bertil, 43
Ronney, Paul, 18
Rosario, Daniel, 73
Rosatelli, Marta, 43
Ross, Frances, 54
Ross, Michael R, 22
Rossi, L. F., 24
Rouse, Jerry, 76
Roux, François-Xavier, 11, 22
Rowenhorst, David, 42
Roy, D, 21
Rubin, MIles B., 40
Rueberg, Thomas, 68
Rugonyi, Sandra, 66
Runesson, Kenneth, 13, 23, 32, 43
Ruotsalainen, Keijo, 30
Russell, Thomas, 18
Ruzzene, Massimo, 65
Ryan, Paul, 47
Rylander, M. Nichole, 13, 42
Rylo, Edimar Cesar, 30
Rypl, Daniel, 68
Saad, George, 59
Saberi, Morteza, 38
Sacco, Elio, 13, 58

Sadovsky, Alexander, 66
Sadrnejad, S. A., 64
Sagar, Gautam, 25
Saha, Nripen, 59
Sahni, Onkar, 31, 56, 65
Sahoo, Prasanna, 47
Saif, Taher, 46, 73
Saitoh, Ken-ichi, 66
Saloner, David, 49, 66
Saloua, Mani Aouadi, 78
Salupere, Andrus, 59
Samanta, Amit, 21
Sameh, Ahmed, 25
Samimi, Mohammad, 78
Sampath, Rahul, 65
Sanchez-Dehesa, Jose, 25
Sandberg, Göran, 12, 70, 75
Sande, Edward, 27
Sanders, Jessica, 59
Sane, Sandeep, 60
Sangalli, Giancarlo, 24
Sankaran, Sethuraman, 28
Sansalone, Vittorio, 38, 63
Santoriello, Andrea, 20
Santos, Felix, 64
Sanz, Pablo, 58
Sarafanov, Oleg, 55
Sarva, Sai S, 39
Sasaki, Shinji, 39
Sauer, Roger, 57
Scalora, Giuseppe, 63
Schanz, Martin, 12, 58, 68
Schatschneider, Bohdan, 25
Schatz, George, 31
Scheele, Josef, 49
Schelling, Patrick, 28, 55
Scherer, Michael, 43, 48
Schevenels, Mattias, 47
Schiavone, Peter, 12, 20
Schlebusch, Rainer, 29
Schmacker, Bruce, 27
Schmauder, Siegfried, 28, 44
Schmid, Fabian, 56
Schöberl, Joachim, 20, 26, 44
Schoeberl, Joachim, 20, 44
Schofield, Sam, 12, 19
Schreyer, Howard L., 13, 21
Schueller, Gerhart, 10, 36, 54, 59
Schuyten, Henry, 31
Schwartzman, David, 38
Schwarz, Ulrich, 61
Schwarze, Marco, 29, 40
Schwarzer, Daniel, 62
Schweizerhof, Karl, 20, 60, 66
Schwer, Len, 2, 10, 65
Scott, Michael, 19, 28
Scovazzi, Guglielmo, 25
Sears, Aaron, 70
Seel, Steve, 54
Segalman, Dan, 25
Segurado, Javier, 75
Selimotic, Mili, 29, 50
Semblat, Jean-François, 68
Sengupta, Arkaprabha, 20
Seo, Yu-Deok, 36
Seracino, Rudolf, 58
Seshaiyer, Padmanabhan, 12, 65, 76
Sett, Kallol, 41
Settgast, Randolph, 46
Shadden, Shawn, 66
Shambaugh, Robert, 37
Shamsian, Shawn, 59
Shapiro, Vadim, 22, 29, 37, 39, 47
Shashkov, Mikhail, 19, 24, 25
Shaw, Amit, 21
Sheehy, Don, 79
Sheeparamatti, Basavaprabhu, 45, 50
Sheeparamatti, Rajeshwari, 45
Shen, Bin, 41
Shen, Yongxing, 78
Shephard, Mark, 11, 27, 56, 58, 65, 74, 77
Sheridan, Michael, 70
Shewchuk, Jonathon, 74
Shi, Jingyi, 20
Shi, Li, 39
Shibutani, Yoji, 56, 75
Shimamoto, Hiroki, 21
Shimpi, Rameshchandra, 41
Shin, David, 31
Shin, Dong Kyu, 36
Shin, Kyung-Jae, 36, 47, 59
Shin, Kyung-Joon, 55
Shin, Woo Kuen, 48
Shing, P. Benson, 13, 66, 67
Shmoylova, Elena, 25
Showalter, Ralph, 72
Shrivastava, Devashish, 42
Shu, Chi-Wang, 10, 55
Shumaker, Dana, 18
Siegmund, Thomas, 36
Silin, Dmitriy, 48
Silling, Stewart, 57
Silva, Angela, 37
Silva, Bruno, 73
Silva, Emilio, 27
Silva, José, 64
Simkins, D. C., 21, 37
Simone, Angelo, 78
Sinha, Shantanu, 31
Sinka, Csaba, 49
Skinner, Gregg, 21
Skye, Ashton, 28, 55
Slemp, Wesley, 31
Smolens'ka, Tetyana, 48
Smolinski, Patrick, 47
Sobh, Nahil, 37
Socoliuc, Anisoara, 75
Sohn, Dongwoo, 26
Soize, Christian, 10, 28, 54, 59
Solares, Santiago, 41
Solberg, Jerome, 10, 25, 50
Soliman, Hazem, 71
Son, Gihun, 29
Song, Bo, 60

Song, Jeong-Hoon, 29, 49
Song, Seong Hyeok, 12, 46
Soong, Sharon Y, 39
Sorrentino, Luigi, 63
Soto, Orlando, 68
Spanos, George, 42
Spearot, Douglas, 11, 26
Spence, Seymour, 29
Spencer, Benjamin, 25, 45, 66
Spilker, Ryan, 48
Spinello, Davide, 58
Spudich, James, 39
Srinivasan, Kartik, 36
Srinivasan, Venkatakrishnan, 29
Srivastava, Anand, 64
Srolovitz, David, 70
Stanciulescu, Ilinca, 25
Stander, Nielen, 49
Starr, Michael, 25
Stavridis, Andreas, 67
Steele, Charles, 29
Stefanelli, Ulisse, 29
Stefanou, George, 12, 29
Steffen, Michael, 48
Stein, Erwin, 11, 25
Steinbock, Oliver, 23
Steinmann, Paul, 13, 43, 48, 54, 56, 57
Stepp, David, 48
Stewart, James R., 20
Stogner, Roy, 37, 63
Stolarski, Henryk, 25, 47
Stone, Tyler, 60
Stowell, Mark, 38
Straka, Mark, 37
Strouboulis, Theofanis, 13, 71
Stuebner, Michael, 45
Stupkiewicz, Stanislaw, 20
Sture, Stein, 10, 13, 58, 62, 77
Stylianopoulos, Triamtafyllos, 27
Subbarayan, Ganesh, 29, 36
Subhash, Ghatu, 39
Sudak, Les, 20
Sudret, Bruno, 46
Suemasu, Hiroshi, 26
Suh, Youngho, 29
Suiker, Akke, 42, 60
Sukumar, N., 26, 29, 47, 49, 57
Sulsky, Deborah, 21
Sumida, Koichi, 44
Sun, Chun, 24
Sun, Kay, 49
Sun, Mingkun, 46
Sun, Qunli, 21
Sun, Shuyu, 18
Sun, Ying, 29, 77
Sundar, Hari, 65
Sundararaghavan, Veera, 49
Sung, Li-yeng, 38
Surana, Karan, 60, 65, 71
Suresh, Krishnan, 11, 18, 27
Suresh, Subra, 39
Sustar, Tomaz, 31
Sustaric, Primoz, 31
Sutradhar, Alok, 31, 73
Svendsen, Bob, 12, 77
Szabo, Barna, 30
Szlufarska, Izabela, 41
Szopa, Romuald, 37
Ta, Quang Anh, 46
Tabarraei, Alireza, 29
Taber, Larry, 38, 43
Taciroglu, Ertugrul, 13, 28
Tadano, Yuichi, 54
Taiebat, Mahdi, 62
Takagi, Kiyoshi, 55
Takahashi, Akiyuki, 59, 61, 70
Takahashi, Toru, 68
Takahashi, Yuya, 27
Takao, Hiroyuki, 21
Takase, Shinsuke, 60
Takeda, Jun, 32
Taki, Yoshihiro, 74
Talebpour, Reza, 78
Tallaron, Christophe, 36
Tam, Enrico, 64
Tamm, Kert, 59
Tamma, Kumar, 11, 54
Tan, Libin, 55, 57
Tan, Lijian, 49
Tanabe, Tadaaki, 26
Tanaka, Hiro, 56
Tanaka, Masato, 24
Tanaka, Satoyuki, 57
Tanaka, Seizo, 60
Tang, Huang, 21, 61
Tang, Liqun, 48
Tang, Tongdar, 48
Tarczewski, Romuald, 20
Tarfulea, Nicolae, 19
Tarn, Jiann-Quo, 25
Tarraf, Raffat, 54
Tatone, Amabile, 38
Tavares, Joao Manuel R., 43, 56
Taylor, C.A., 2, 12, 31, 38, 48, 49, 55
Taylor, Glenn, 77
Tchelepi, Hamdi, 23
Tchijov, Vladimir, 37
Tchonkova, Maria, 62
Teixeira, Jose, 37
Teixeira, Senhorinha, 37
Tejada-Martinez, Andres, 31
Temizer, Ilker, 25
Templeton, Jeremy, 64, 72
TenEyck, Alexander, 27
Teng, Hailong, 59
Tepocyotl, Margarita, 45
Terada, Kenjiro, 11, 37, 40, 49, 57
Teresco, James, 28
Teresi, Luciano, 38, 44
Tersoff, Jerry, 54
Tezaur, Radek, 19, 50, 76
Tezduyar, Tayfun, 10, 20, 25, 55, 60
Thomas, Slawson R., 73
Tian, Rong, 66
Tillberg, Johan, 43
Tippur, Hareesh, 54
Titeux, Isabelle, 67
Titz, Benjamin, 27
Tjahjanto, Denny, 60
To, Albert, 61

Toader, Anca-Maria, 22
Toit, Jat du, 12, 75
Toivanen, Jari, 19
Tomar, Vikas, 10, 39
Tompson, Andrew, 18
Torii, Ryo, 55
Torrent, Daniel, 25
Torres-Verdin, Carlos, 10, 42
Toscano, Rita, 45, 78
Touya, Thierry, 62
Tralli, Antonio, 79
Tran-Cong, Thanh, 26
Trofimova, Alisa, 31
Tromp, Rudolf, 54
Trovalusci, Patrizia, 63
Tsau, Shih-Horng, 32
Tsuganezawa, Yohei, 25
Tsukanov, Igor, 37, 39, 47
Tsuru, Tomohito, 75
Tu, Shuangzhang, 21
Tuck-Lee, James, 29
Turkiyyah, George, 37
Turner, Daniel, 45
Turteltaub, Sergio, 20, 42, 60
Ubach de Fuentes, Pere-Andreu, 47
Ubertini, Francesco, 45
Udaykumar, H. S., 60, 66, 71
Uhm, Tae-Kyoung, 36
Ulbin, Miran, 66
Ünlü, Utku, 48
Ushizima, Daniela, 43
Uva, Giuseppina, 73
Valavala, Pavan, 28
Valdebenito, Marcos, 59
Valentin, A., 43
Valentin, Frederic, 30, 59
Valiveti, Dakshinamurthy, 65
Valli, Andrea, 45
van Bloemen Waanders, Bart, 70
van Brummelen, Harald, 10, 30, 65
Van der Giessen, Erik, 20, 78
van der Zee, Kristoffer, 65
van Dommelen, Johannes, 78
van Hal, Bas, 78
van Mier, Jan G.M., 66
Vandepitte, Dirk, 41
Varano, Valerio, 38, 79
Varela, Jorge, 66
Vargas-Torres, Felipe, 37
Varona, Jorge, 45
Vassilev, Danail, 18
Vaz, Luiz Eloy, 32
Vaz, Mario, 43
Vaziri, Ashkan, 10, 27, 39, 45
Vazquez, Mariano, 79
Velazquez, Ramiro, 12, 40
Vergara, Christian, 22, 38
Vernerey, Franck, 54, 57, 61
Vernik, Lev, 42
Vesenjak, Matej, 66
Vidrascu, Marina, 27
Vieira de Lemos, J., 67
Vigmostad, Sarah, 60, 66
Vignon-Clementel, Irene, 48, 49, 65
Vignoud, Lionel, 36
Vilotte, Jean-Pierre, 23
Vinogradov, Aleksandra, 60
Vinogradov, Oleg, 21
Vintila, Dragos, 67
Vlassak, Joost, 10, 73
Vogler, Tracy, 24
Voller, Vaughan, 37
Vondrak, Vit, 28
Voorhees, Peter, 28
Vossoughi, Fariborz, 31
Voyiadjis, George Z., 54, 77
Vu-Quoc, Loc, 10, 37
Vyunenko, Lyudmila, 25
Wada, Yoshitaka, 63, 65
Wagner, Greg, 50, 64, 72
Wagner, Werner, 19, 28, 49
Waisman, Haim, 24, 31
Wall, Wolfgang A., 13, 22, 25, 55, 63
Wallstedt, Philip, 57
Walsh, Joe, 58
Walsh, Timothy, 76
Walters, M.C., 41
Wan, Frederic, 66
Wan, Xiaoliang, 44, 75
Wanderer, John, 26
Wang, Bing, 55
Wang, Gong Li, 42
Wang, Haiying, 23
Wang, Hongwu, 49
Wang, Hui-Ping, 10, 31, 39
Wang, Hungjen, 71
Wang, James, 56
Wang, Qian, 23
Wang, Qiqi, 46
Wang, Ruikang, 66
Wang, Sheng Ping, 32
Wang, Yuping, 48
Wang, Zhen, 26
Warden, Karen, 43
Warner, Derek, 26
Watanabe, Dai, 21
Waterloo, Knut, 43
Wawrzynek, Paul, 79
Webb III, Edmund, 28
Wei, Sun, 27
Weinhart, Thomas, 22
Wellford, Carter, 18
Wellmann Jelic, Andres, 70
Wells, Joe, 24
Wenk, Jonathan, 2, 65
Wesevich, James, 60
West, Matthew, 44
Westerink, Hans, 55
Westerink, Joannes, 13, 45, 55, 60
Wheeler, Mary, 23
White, Daniel, 38
White, Laurent, 28
Wiechert, Lena, 55
Wilcox, Lucas, 70
Willam, Kaspar, 4, 9, 16, 26, 73
Willcox, Karen, 70

Williams, John, 11, 72
Williams, John L., 47
Willment, Tim, 25
Willner, Kai, 54
Windl, Wolfgang, 73
Winther, Ragnar, 20, 41
Wirth, Brian, 61
Wise, Steven, 18
Wohlmuth, Barbara, 59, 73
Wojtkiewicz, Steve, 54
Woo, Sung-Sik, 18, 23
Wriggers, Peter, 9, 11, 24, 25, 34, 45, 73, 76
Wu, C. T., 21, 26, 31, 39
Wu, Fubang, 59
Wu, Qingxi, 23
Wu, Wei, 54, 60
Wuechner, Roland, 63
Xi, Yunping, 26
Xiang, Yang, 70
Xiang, Yong, 73
Xiao, Heng, 27
Xiao, Robert, 12, 71
Xiao, Shaoping, 10, 59, 70
Xiao, Xinran, 76
Xie, Jianhui, 32
Xie, Ting, 56
Xie, Wei, 39, 45
Xie, Wenfeng, 74
Xiong, Liming, 44
Xiu, Dongbin, 11, 23
Xu, Jinchao, 19
Xu, Jingxiao, 26, 39
Xu, Mei, 70
Xu, Steve, 47
Xu, X. Frank, 29, 56
Xu, Zhiliang, 60
Xue, Zhenyu, 10, 27, 39
Yagawa, Genki, 42
Yamada, Takahiro, 57
Yamagata, Nobuki, 66
Yamazaki, Daisuke, 57
Yan, Beichuan, 58
Yan, Jue, 31
Yan, Jun, 20
Yan, Karen C., 27
Yanase, Keiji, 55
Yang, Mijia, 57
Yang, Qiang, 50
Yang, Weixuan, 70
Yang, Yeong-Bin, 60
Yang, Yi, 18, 71
Yang, Zhaochun, 47
Yang, Zhengxiong, 30
Yap, Enghui, 56
Yasuzaka, Taiki, 42
Yavari, Barry, 28
Yaw, Louie L., 47
Ye, Wenjing, 67
Yeo, Sim-Dong, 55
Yevdokymov, Dmytro, 48, 74
Yi, Son-Young, 72
Yin, Huiming, 46
Yiu, Fang (Flora), 42
Yoon, J. W., 18
Yoon, Jeong-Rock, 62
Yoon, Young Ha, 61
Yoon, Young-Cheol, 57
Yoshimura, Shinobu, 60, 61
Yosibash, Zohar, 55
Yotov, Ivan, 11, 18
Youn, Sung-Kie, 36
Young, Yin Lu, 27, 58, 74
Yu, Eun-Jong, 18, 23
Yu, Jun, 18
Yuan, Kuo-Yao, 49
Yuan, Robert. L, 64
Yuan, Zheng, 54, 60
Yuge, Kohei, 21, 25, 47, 67
Zabaras, Nicholas, 28, 49, 59, 75
Zagaris, George, 24
Zaglmayr, Sabine, 20, 44
Zaki, Tamer, 31
Zako, Masaru, 61
Zaman, Muhammad, 45
Zarrouk, David, 66
Zastrau, Bernd W., 29
Zauscher, Stefan, 25
Zavarin, Mavrik, 18
Zavattieri, Pablo, 10, 26
Zdunek, Adam, 38
Zeman, Jan, 49
Zerbini, Sarah, 78
Zhang, Dali, 59
Zhang, GangMing, 57
Zhang, Lucy, 60, 65
Zhang, Qi-Lin, 20
Zhang, Sulin, 11, 31
Zhang, Yan, 63
Zhang, Yongjie, 11, 20, 43, 44, 47
Zhang, Yong-Tao, 55
Zhang, Yong-Wei, 70
Zhang, Zhengyu, 41
Zhang, Zhihong, 49
Zhang, Zhiqian, 39
Zhao, Guoqun, 71
Zhao, Hong, 36, 60
Zhao, Hong-Kai, 55, 78
Zhao, Kuizhi, 23
Zhao, Wenqi, 39, 46
Zhao, Xuefeng, 21
Zheglova, Polina, 62
Zheng, Qingjin, 72
Zhong, Yuan, 39
Zhou, Feng, 39
Zhou, Min, 10, 26, 39
Zhou, Ming, 10, 25
Zhou, Xiangmin, 54
Zhu, Ting, 11, 21, 31, 39
Zi, Goangseup, 37
Zikatanov, Ludmil, 19
Zimmerman, Jon, 21
Zimmermann, Dominik, 38
Zimmermann, Thomas, 62
Zofka, Adam, 41
Zohdi, T. I., 13, 65, 67, 72
Zuazua, Enrique, 45
Zunino, Paolo, 38
Zywicz, Edward, 26

NOTES

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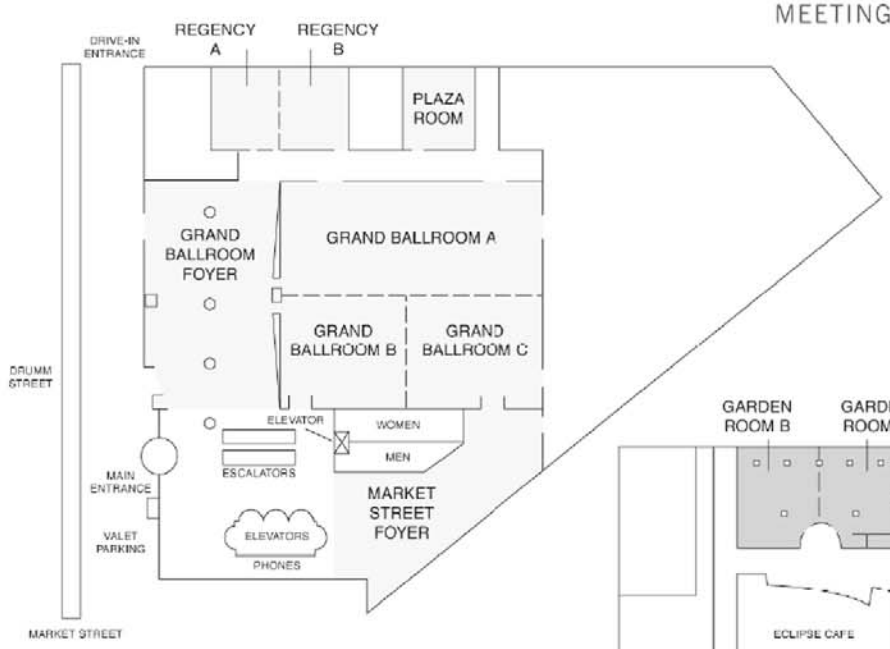
MEETING ROOM FLOOR PLANS

STREET LEVEL



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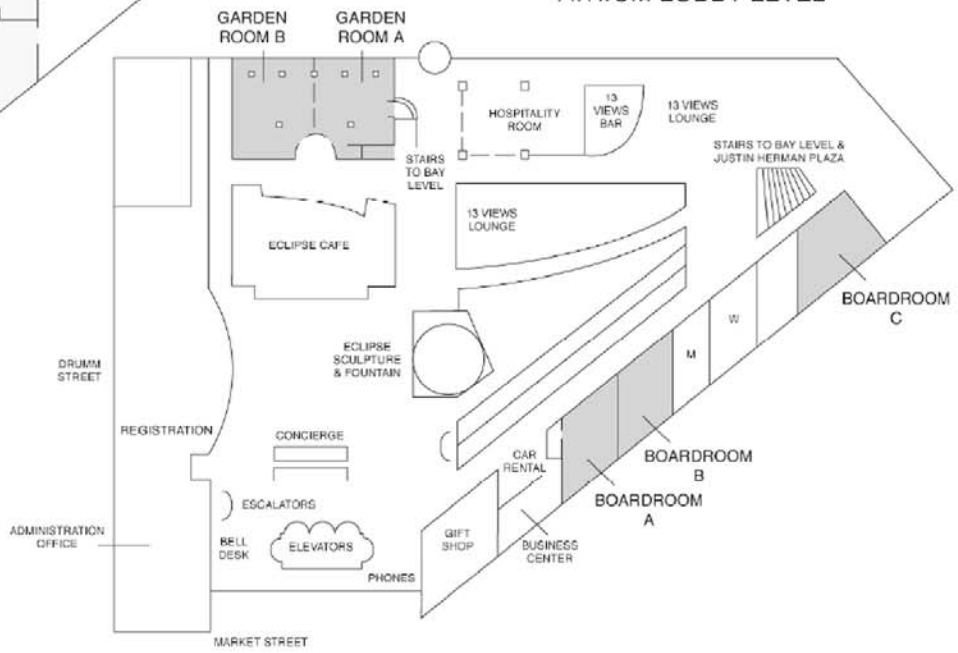

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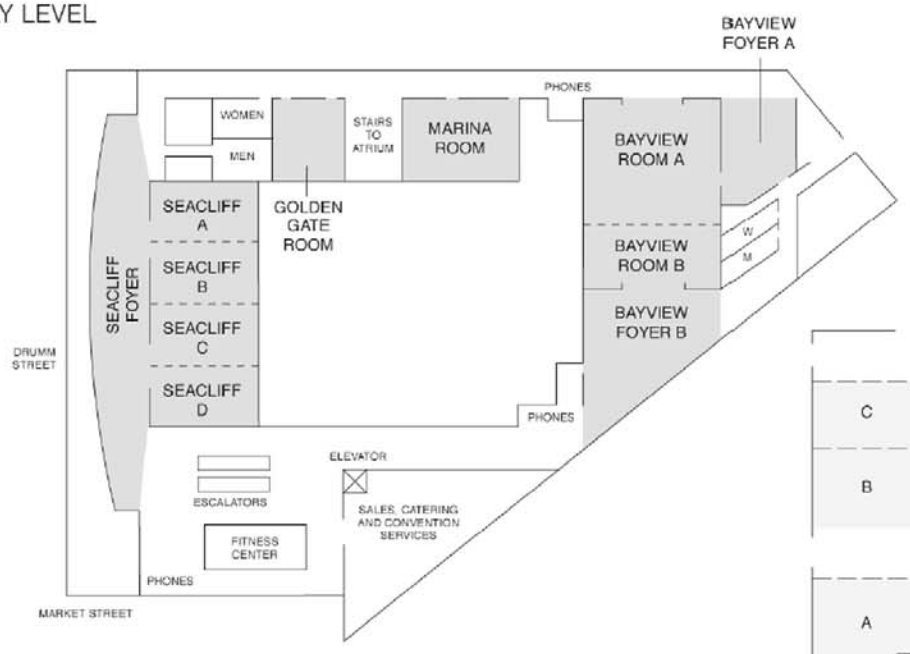
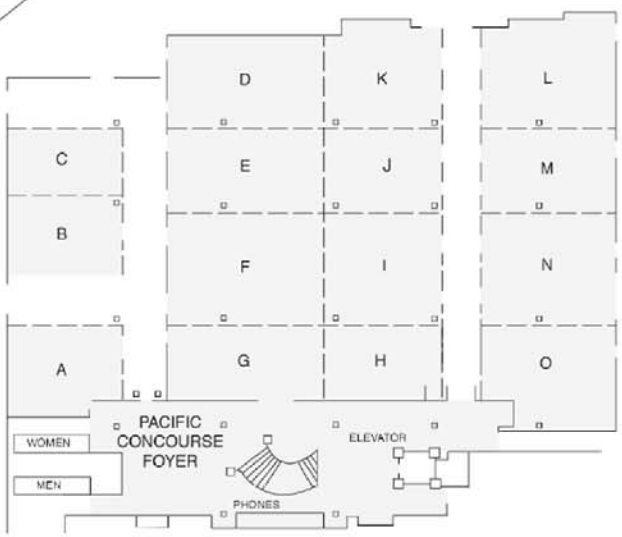
PACIFIC CONCOURSE LEVEL