

IASS-IACM 2008 Technical Program – Listing/Table of Contents

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Session W-1-A Wednesday, May 28, 9:00 - 10:45 a.m.

Session	W-1 Room A: Statler Auditorium
Title	Opening and Plenary Lectures
Chair	John ABEL, Gregory HULBERT
9:00 - 9:15	Opening Remarks John ABEL, Organizing Chair & President of IASS Gregory HULBERT, President of USACM [tbd], Cornell University
9:15 - 10:00	Nanomechanical resonators and nanofluidic systems <i>Harold G. CRAIGHEAD (Cornell University)</i>
10:00 - 10:45	Large shell structures for power generation technologies <i>Wilfried B. KRÄTZIG (Ruhr-University Bochum), Reinhard HARTE (University of Wuppertal), Ralf WÖRMANN (Krätzig & Partner)</i>

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For multiple-author papers:

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Session W-2-A Wednesday, May 28, 11:15 a.m.-12:45 p.m.

Session Title: Nano- and Micro-scale Structures I

Session Organizers: (Slava KRYLOV, Alan ZEHNDER)

Chairs: Slava KRYLOV, Alan ZEHNDER

Keynote Lecture

An atomistic-continuum elastic rod model of carbon nanotubes

Karthick CHANDRASEKER, Subrata MUKHERJEE (Cornell University)*

A novel shift-loaded blister test to characterize the multi-scale mechanical properties and adhesion-delamination behaviors of biomembranes

Scott E. JULIEN(Northeastern University), Kuo-Kang LIU (Keele University), Kai-tak WAN (Northeastern University),*

Hybrid sensing procedure for mass and position detection with nano and macro resonant cantilevers

Nicolae LOBONTIU (University of Alaska Anchorage), Iulian LUPEA, Rob ILIC, Harold G. CRAIGHEAD (Cornell University)*

Stability analysis of a curved microbeam actuated by a distributed electrostatic force

Slava KRYLOV (Tel Aviv University), Bojan R. ILIC (Cornell University), David SCHREIBER, Shimon SERETENSKY (Tel Aviv University), Harold G. CRAIGHEAD (Cornell University)*

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Session W-2-B Wednesday, May 29, 11:15 a.m.-12:45 p.m.

Session Title: Numerical Simulation of Biological Structures I

Session Organizer: (Wilkins AQUINO)

Chairs: Wilkins Aquino, J. Robert COOKE

Keynote Lecture

Computational modeling of glucose distribution in hollow fiber membrane bioreactors
G.U. UNIKRISHNAN, V.U. UNIKRISHNAN, J.N. REDDY (Texas A&M University)*

Characterization of viscoelastic properties of cylindrical vessels using the velocity response produced by an impulsive force

Daniel E. ROSARIO, Wilkins AQUINO (Cornell University)*

Solid versus membrane finite elements in analysis of the mitral valve: A case study

Victorien PROT, Bjorn SKALLERUD (Norwegian University of Science and Technology)*

An inverse problem approach for elasticity imaging through vibroacoustics

Miguel AGUILO, Wilkins AQUINO (Cornell University)*

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Session W-2-C Wednesday, May 28, 11:15 a.m.-12:45 p.m.

Session Title: Modeling and Simulation of Discontinua

Session Organizer: (Shang-Hsien HSIEH)

Chairs: Shang-Hsien HSIEH, Herbert HUI

Keynote Lecture

The roots of possible chaotic behavior in modeling and simulation of discontinua

Antonio MUNJIZA (University of London), T. CARNEY, E. KNIGHT, R.P. SWIFT, D. GREENING, D. STEEDMAN (Los Alamos National Laboratory)*

Motion analysis of mixed polyhedral and ellipsoidal particles

Chung-Yue WANG, Jopan SHENG, Chih-Jung HUANG, Ming-Hong CHEN (National Central University)*

A fluid-particle simulation for two-phase granular flow

Li-Pen WANG, Ying-Pao LIAO, Chuin-Shan CHEN, Fu-Ling YANG, Shang-Hsien HSIEH (National Taiwan University)*

Discrete element simulation of a collision-rich solid-liquid flow using a liquid-modified contact model

Fu-Ling YANG, Wei-Tze CHANG, Shang-Hsien HSIEH, Chuin-Shan CHEN (National Taiwan University)*

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Session W-2-D Wednesday, May 28, 11:15 a.m.-12:45 p.m.

Session Title: Fracture in Natural and Engineered Systems I

Session Organizers: (Robert HABER, Anthony INGRAFFEA)

Chairs: Robert HABER, Anthony INGRAFFEA

Keynote Lecture

Assessment of stiffened shell structures using advanced fracture and damage mechanics methods

*Karl-Heinz SCHWALBE**, Wolfgang BROCKS, Alfred CORNEC, Wernfried Schönfeld, Ingo SCHEIDER, Uwe ZERBST (GKSS Research Centre)

Residual strength characterization of integrally-stiffened structures utilizing novel manufacturing technologies

*B. R. SESHADRI, S. W. SMITH**, W. M. JOHNSTON, JR. (NASA Langley Research Center)

Towards modeling of fragmentation and dynamic delamination interactions in CFRP composites

*Jean-Mathieu GUIMARD**, Oliver ALLIX (ENS Cachan), Nicolas PECHNIK (AIRBUS France), Pascal THEVENET (EADS France)

A damage-based cohesive model in an adaptive spacetime discontinuous Galerkin method

*Reza ABEDI, Robert B. HABER** (University of Illinois at Urbana-Champaign)

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Session W-2-E Wednesday, May 28, 11:00 a.m.-12:30 p.m.

Session Title: Computational Methods for Tension Structures I

Session Organizer: (SeungDoeg KIM)

Chair: SeungDoeg KIM, Juan Gerardo OLIVA SALINAS

Keynote Lecture

On the development of general purpose computational program for nonlinear analysis of soft/hard structures

SeungDoeg KIM (Semyung University)

Lateral buckling load formulation for multi-strut beam string structures

Jaeyeol KIM (Hyupsung University), Minger WU (Tongji University)*

A simple procedure for the analysis of hyperelastic 3D membrane structures

Vinicius F. ARCARO (UNICAMP, Brazil)

Test on the mechanical properties of architectural membrane

Kang-geun PARK, Seong-kee YOON (Pusan National University), Woo-hong JEON (Korea Apparel Testing & Research Institute)*

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Session W-3-A Wednesday, May 28, 2:00-4:00 p.m.

Session Title: Nano- and Micro-scale Structures II

Session Organizers: (Slava KRYLOV, Alan ZEHNDER)

Chairs: Slava KRYLOV, Alan ZEHNDER

Keynote Lecture

On the accuracy of compliant mechanical MEMS/NEMS lumped-parameter modeling
Nicolae LOBONTIU (University of Alaska Anchorage)

The response of a cantilever microbeam with a plate attached to its tip to mechanical shock
*Hassen OUAKAD (Binghamton University), Haider N. ARAFAT (Cessna Aircraft Company),
Mohammad I. YOUNIS* (Binghamton University)*

Switch triggered by mass threshold
Mohammad I. YOUNIS, Fadi M. AL SALEEM (Binghamton University)*

Adhesion of freestanding beams and its application to micro- and nano-structures
Kai-tak WAN (Northeastern University)

Modeling and dynamics of coupled dome-shaped micromechanical oscillators
Tuhin SAHAI, Alan ZEHNDER (Cornell University)*

Fully Lagrangian dynamics of thin MEMS beam
Ranajay GHOSH, Subrata MUKHERJEE (Cornell University)*

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Session W-3-B Wednesday, May 29, 2:00-4:00 p.m.

Session Title: Numerical Simulation of Biological Structures II

Session Organizer: (Wilkins AQUINO)

Chairs: Wilkins Aquino, J. Robert COOKE

Proper orthogonal decomposition model reduction for inverse problems in acoustic-structure interaction

John C. BRIGHAM, Wilkins AQUINO (Cornell University)*

Shell analysis of elliptical guard cells in higher plants: A review

*J. Robert COOKE**, *Richard RAND (Cornell University)*, *Herbert MANG (TU Vienna)*, *Josse DeBAERDEMAEKER (Katholieke Universiteit Leuven)*, *Jae Young LEE (Chonbuk National University)*

In vivo ultrasound bone property determination through inverse finite element modeling

*Mija HUBLER**, *Wilkins AQUINO*, *Christopher EARLS (Cornell University)*

Finite element analyses of palm leaf petiole-sheath junctions in simple bending and twisting and in dynamic (oscillatory) flexure

*Karl NIKLAS**, *J. Robert COOKE (Cornell University)*, *Jae Young LEE (Chonbuk National University)*

Modeling pipette aspiration of biological membranes

Philip BUSKOHL (Cornell University)

A new model for nucleation in two-phase lipid bilayer membrane vesicles

*Sanjay DHARMAVARAM**, *Timothy HEALEY (Cornell University)*

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Session W-3-C Wednesday, May 28, 2:00-4:00 p.m.

Session Title: Advances in Shell Finite Elements I

Session Organizer: (Christopher EARLS)

Chairs: Christopher EARLS, J. N. REDDY

Keynote Lecture

Stressing thermo-mechanical analysis of FGM shells

*J.N. REDDY** (Texas A & M), *Román A. ARCINIEGA* (ABAQUS)

An investigation of the isogeometric approach from the viewpoint of finite element technology

*Ralph ECHTER**, *Manfred BISCHOFF* (University of Stuttgart)

Locking-free formulation for the stabilized enhanced strain solid-shell element (SHB8PS): Geometrically non-linear applications

*Farid ABED-MERAIM** (LPMM), *Alain COMBESCURE* (LaMCoS)

New prismatic solid-shell element: Assumed strain formulation and evaluation of benchmark problems

*Vuong-Dieu TRINH**, *Farid ABED-MERAIM* (LPMM), *Alain COMBESCURE* (LaMCoS)

Evolution of the new rotation-free finite element shell triangle using accurate geometrical data

*Pere-Andreu UBACH **, *Eugenio OÑATE* (CIMNE, UPC)

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Session W-3-D Wednesday, May 28, 2:00-4:00 p.m.

Session Title: Fracture in Natural and Engineered Systems II

Session Organizers: (Robert HABER, Anthony INGRAFFEA)

Chairs: Robert HABER, Anthony INGRAFFEA

A unified potential-based cohesive model of mixed-mode fracture

*Gláucio H. PAULINO**, *Kyoungsoo PARK*, *Jeffrey ROESLER* (The University of Illinois at Urbana-Champaign)

Surface and embedded cracks in offshore pipelines subjected to plastic strains

*Espen BERG**, *Bjørn SKALLERUD*, *Kjell HOLTHE* (Norwegian University of Science and Technology)

Automated finite element based predictions of simultaneous crack growth and delamination growth in multi-layers in advanced metallic hybrid stiffened panels using the Alcoa ASPAN-FP tool

*Henry SKLYUT**, *Michael KULAK*, *Marcus HEINIMANN*, *Mark JAMES* (Alcoa Technical Center), *Olexander V. GONDLIAKH*, *Roman PASHINSKIJ* (KPI, Kiev, Ukraine)

Crack trajectory prediction in thin shells using finite element analysis

*Jake D. HOCHHALTER**, *Ashley D. SPEAR*, *Anthony R. INGRAFFEA* (Cornell University)

Analysis of localized failure in metal beams and plates

Jaka DUJC, *Boštjan BRANK** (University of Ljubljana), *Adnan IBRAHIMBEGOVIC* (ENS Cachan)

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Session W-3-E Wednesday, May 28, 2:00-4:00 p.m.

Session Title: Membrane and Tension Structures

Chairs: Slade GELLIN, Subrata MUKHERJEE

Realistic modeling of tensioned fabric structures

*Julio B. PARGANA, David LLOYD SMITH, Bassam A. IZZUDDIN** (Imperial College London)

Vaccumatics: Vacuumatically prestressed (adaptable) structures

Frank HUIJBEN, Frans van HERWIJNEN* (Eindhoven University of Technology)

Wrinkling evaluation of membrane structures

Lu GUO (Cybernet Systems Co.)

Wrinkling of stretched elastic films via bifurcation

Ron-Bin CHENG, Tim HEALEY* (Cornell University)

A comparison of four flattening methods for tensioned fabric structures

Slade GELLIN (Buffalo State College)

On the calculation of elastic systems having blocks and sagging cables

Vadym GORDEIEV, Oleksandr OGLOBLYA, Maryna SHYMANOVSKA* (V. Shimanovsky UkrRDIsteelconstruction)

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Session W-4-A Wednesday, May 29, 4:30-6:15 p.m.

Session Title: Educational Software/Structural Monitoring

Chairs: Wolfgang WALL, Phaedon-Stelios KOUTSOURELAKIS

Finite element implementation for computer-aided instruction of structural mechanics
*Jae Young LEE**, *Sung-Youll AHN (Chonbuk National University)*

MASTAN2, educational analysis software for the 21st century
*Ronald D. ZIEMIAN** (*Bucknell University*), *William McGUIRE (Cornell University)*

Spot monitoring and time-dependent analysis of high-rise building construction process
*Shenwei ZHANG** (*Shandong University*), *Qilin ZHANG*, *Xin LOU (Tongji University)*

A model-based framework for real-time structural monitoring in uncertain environments
Phaedon-Stelios KOUTSOURELAKIS (Cornell University)

Prediction of maximum deflection of double layer grid space structure using neural networks
*Reza KAMYAB MOGHADAS** (*Iranian Academic Center for Education, Culture and Research*), *Kok Keong CHOONG*, *Sabarudin MOHD (Universiti Sains Malaysia)*

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Session W-4-B Wednesday, May 28, 4:30-6:20 p.m.

Session Title: Design-Oriented Modeling of Nonlinear Structures

Session Organizer: (Bassam IZZUDDIN)

Chairs: Bassam IZZUDDIN, William McGUIRE

Keynote Lecture

Simplified modeling of nonlinear structures – “Spanning component to system”

Bassam A. IZZUDDIN (Imperial College)

Limit analysis of slabs revisited with finite element models

*Edward MAUNDER**, *Angus RAMSAY (University of Exeter)*

Effects of boundary conditions on the non-linear long-term behavior of spherical shallow concrete domes

*Ehab HAMED**, *Mark A. BRADFORD*, *R. Ian GILBERT (University of New South Wales)*

A local failure model for shallow spherical concrete domes subjected to uniform radial pressure

Zhen-Tian CHANG, *Mark A. BRADFORD**, *R. Ian GILBERT (University of New South Wales)*

Probabilistic analysis of steel silo’s cylindrical shell with random geometric imperfection

*Ganping SHU**, *Chong ZHANG*, *Jian GU (Southeast University)*

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Session W-4-C Wednesday, May 28, 4:30-6:00 p.m.

Session Title: Advances in Shell Finite Elements II

Session Organizer: (Christopher EARLS)

Chairs: Christopher EARLS, J. N. REDDY

New curvature formulation of the SFE rotation-free shell element

*Sylvain COUËDO**, *Laëtitia DUGOU*, *Gérard RIO (LIMATB, UBS)*

Largest geometrically exact nonlinear thin beam, plate & shell elements and c-type FEM

Debabrata RAY (Institute for Dynamic Response, Inc.)

A new shell element for elasto-plastic finite strain analysis: Application to the collapse and post-collapse analysis of marine pipelines

*Rita TOSCANO** (*University of Buenos Aires*), *Eduardo DVORKIN (SIM&TEC)*

A finite element analysis of axially crushed corrugated frusta

Mahmoud M. A. YOUNES (M.T.C. Cairo)

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Session W-4-D Wednesday, May 28, 4:30-6:10 p.m.

Session Title: Computational Models for Fracture and Degradation of Structures I

Session Organizers: (Günther MESCHKE, Jan ROTS)

Chairs: Günther MESCHKE, Jan ROTS

Stepwise softening for concrete and masonry structures

*Jan G. ROTS**, *Max A.N. HENDRIKS*, *Matt J. DEJONG (TU-Delft)*, *Beatrice BELLETTI (University of Parma)*

The multi-scale approach of masonry, paradigm of the clay brick

*Konrad J. KRAKOWIAK**, *Paulo B. LOURENÇO (University of Minho)*, *Franz-J. ULM (MIT)*

Simplified modeling strategies for non linear dynamic calculations of RC structural walls including soil-structure interaction

*Panagiotis KOTRONIS**, *J. MAZARS*, *S. GRANGE*, *C. GIRY (Grenoble Universités)*

Modeling mixed-mode crack propagation in reinforced concrete

*Rena C. YU**, *Gonzalo RUIZ*, *Jacinto R. CARMONA (University of Castilla-La Mancha)*

Limit-analysis based identification of fracture and degradation mechanisms in two-phase composite materials

*Josef FÜSSL** (*TU Vienna*), *Roman LACKNER (TU Munich)*

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Session W-4-E Wednesday, May 28, 4:30-6:00 p.m.

Session Title: Computational Methods for Tension Structures II

Session Organizer: (SeungDoeg KIM)

Chair: SeungDoeg KIM, Juan Gerardo OLIVA SALINAS

Keynote Lecture

Simplified computer-aided form-finding procedures applied to lightweight structures
*Juan Gerardo OLIVA SALINAS**, *Eric VALDEZ OLMEDO (UNAM)*

Shape formation of ETFE film cushion by heat and pressure considering visco-plastic characteristics

*Masaya KAWABATA**, *Kaoru NISHIKAWA (Yokohama National University)*

Shape finding of membrane structures by the natural force density method

*Ruy M.O. PAULETTI**, *Paulo M. PIMENTA (University of São Paulo)*

Topology and shape of tensegrity structures

*Jingyao ZHANG**, *Makoto OHSAKI (Kyoto University)*

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Session T-1-A Thursday, May 29, 9:00 - 10:30 a.m.

Session	T-1 Room A: Statler Auditorium
Title	Plenary Lectures
Chair	Wilfried KRÄTZIG, Sergio PELLEGRINO
9:00 - 9:45	Analysis and design of materials and structures for attenuating vibration and acoustic response <i>Gregory M. HULBERT, E. M. DEDE, C. YILMAZ, Z.-D. MA, Noboru KIKUCHI (University of Michigan)</i>
9:45 - 10:30	Modeling of shells with three-dimensional finite elements <i>Manfred BISCHOFF (University of Stuttgart)</i>

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Session T-2-A Thursday, May 29, 11:00 a.m.-12:30 p.m.

Session Title: Alexander Scordelis Memorial Session: Thin Shell Concrete Structures I

Session Organizer: (Maria GARLOCK)

Chairs: John ABEL, Phillip GOULD

Keynote Lecture

Alexander Scordelis: Friend, colleague and mentor

David P. BILLINGTON (Princeton University)

Keynote Lecture

Alexander C. Scordelis and concrete shells

Christian MEYER (Columbia University)

Keynote Lecture

Alex C. Scordelis' great achievements in bridge engineering – From computer programs to the Golden Gate Bridge retrofit

Ekkehard RAMM (Stuttgart University)

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Session T-2-B Thursday, May 29, 11:00 a.m.-12:30 p.m.

Session Title: Dynamic Analysis of Spatial Structures I

Session Organizer: (Su-Duo XUE)

Chairs: Su-Duo XUE, Shiro KATO

Keynote Lecture

Seismic risk analysis of large lattice dome supported by buckling restrained braces
*Shiro KATO**, *Shoji NAKAZAWA (Toyohashi University of Technology)*

A parameter study on dynamic buckling of spatial arch trusses under seismic action
*Hai-Wang LI**, *Jian-Xian LI*, *Fei ZHI*, *Fu MA*, *Dong-Qi QIN (Taiyuan University of Technology)*

Static elasto-plastic analysis of long-span rigid spatial structures under vertical earthquake
*Yongfeng LUO** (*Tongji University*), *Muwang YANG (East China Normal University)*

Problems in the research of multi-dimensional and multi-support seismic analysis
*Pengfei ZHAO**, *Jihong QIAN*, *Rongwei TANG (China Academy of Building Research)*

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Session T-2-C Thursday, May 29, 11:00 a.m.-12:30 p.m.

Session Title: 3D Modeling of Thin-Walled Structures

Session Organizers: (Manfred BISCHOFF, Ekkehard RAMM)

Chairs: Manfred BISCHOFF, Yuri BAZILEVS

Keynote Lecture

Modeling and mesh error estimates for plates and thick shells

*Uros BOHINC, Boštjan BRANK (University of Ljubljana), Adnan IBRAHIMBEGOVIC**,
(ENS-Cachan)

Physical applications for a nonlinear micropolar formulation on shells

Ingo MÜNCH, Werner WAGNER (Universität Karlsruhe), Patrizio NEFF (TU Darmstadt)*

Utilization of the assumed natural strain method in a surface-related solid-shell element

Bernd W. ZASTRAU, Rainer SCHLEBUSCH (TU Dresden)*

Dimensional adaptivity in finite element simulation of sheet metal forming

Dmitry LEDENTSOV, Alexander DÜSTER, Ernst RANK (TU München), Ingo HEINLE,*
Wolfram VOLK, Marcus WAGNER (BMW Group, München)

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Session T-2-D Thursday, May 29, 11:00 a.m.-12:30 p.m.

Session Title: Innovative Analysis Topics

Chairs: Günther MESCHKE, Wilkins AQUINO

The stability of plane shape under bending of elastically-plastic finite rigidity tendons, having non-symmetrical cross-section

Oleksandr SHYMANOVSKYI, Valeryi SHALYNSKYI (V. Shimanovsky UkrRDIsteelconstruction)*

Internal forces and displacements in polynomial-shaped arches

Lazaro GIMENA, Pedro GONZAGA, Faustino GIMENA (Public University of Navarre)*

Decision of initial shape and stress from equilibrium shape by structural analysis based on condition for existence of solution

Tetsu-Yuki TANAMI

Mistakes and paradoxes in solutions of spatial, geometrically nonlinear problems and equilibrium stability problems

Anatoly V. PERELMUTER (SCAD Soft), Vladimir I. SLIVKER (JSC Giprostroymost)*

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Session T-2-E Thursday, May 29, 11:00 a.m.-12:30 p.m.

Session Title: Composites I

Chairs: *Rigoberto BURGUEÑO, S. Leigh PHOENIX*

Multiscale analysis of delamination in composites laminate
*Pierre KERFRIDEN**, *Olivier ALLIX*, *Pierre GOSSELET (ENS Cachan)*

Modeling and simulation of bio-based polymer/clay nanocomposites through a multilevel FE approach
Mahmoodul HAQ, *Rigoberto BURGUEÑO** (*Michigan State University*)

Multilayer composite timber beams: Kinematical modeling and analytical solutions
Thomas MOOSBRUGGER, *Werner GUGGENBERGER** (*TU Graz*)

Reduced order anisotropic micro-mechanical creep model for composite materials
*Erez GAL** (*Ben-Gurion University*), *Jacob FISH (RPI)*

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Session T-2-F Thursday, May 29, 11:00 a.m.-12:30 p.m.

Session Title: New Advances in Topology Optimization I

Session Organizers: (Gláucio H. PAULINO, Emílio SILVA)

Chairs: Gláucio H. PAULINO, Emílio SILVA

Keynote Lecture

Topology optimization with adaptive mesh refinement

*Eric DE STURLER** (Virginia Tech), Gláucio H. PAULINO, Shun WANG (University of Illinois at Urbana-Champaign)

Strategies for computational efficiency in continuum structural topology optimization of sparse 3D systems

*Colby C. SWAN**, Salam F. RAHMATALLA (University of Iowa)

Wachpress elements for topology optimization

*Cameron TALISCHI**, Gláucio H. PAULINO, Chau H. LE (University of Illinois at Urbana-Champaign)

Topology optimization technique considering both static and dynamic characteristics of the structures

*S. J. LEE**, J. E. BAE (Gyeongsang National University)

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For multiple-author papers:

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Session T-3-A Thursday, May 29, 2:00-4:00 p.m.

Session Title: Alexander Scordelis Memorial Session: Thin Shell Concrete Structures II

Session Organizer: (Maria GARLOCK)

Chairs: Powell DRAPER, Phillip GOULD

3-D pushover analysis of a collapsed reinforced concrete chimney

Wei HUANG (KPF Consulting Engineers), Phillip L. GOULD (Washington University)*

Structural optimization of concrete hyperbolic paraboloid umbrella shells

Powell DRAPER, Maria E. Moreyra GARLOCK, David P. BILLINGTON (Princeton University)*

Tenerife and Cuernavaca: A comparative critical analysis

Sinéad C. MAC NAMARA (Syracuse University)

Testing, modeling and constructing wood-plastic composite Catalan vaults

Edmond SALIKLIS, Kyle WHITE (Cal Poly)*

Concrete vaulting in Imperial Rome: A structural analysis of the Great Hall of Trajan's Markets

Renato PERUCCHIO, Philip BRUNE (University of Rochester)*

Numerical study of steel corrosion in concrete shell members

O. Burkan ISGOR, Mohammad POUR-GHAZ, Pouria GHODS (Carleton University)*

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For multiple-author papers:

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Session T-3-B Thursday, May 29, 2:00-4:00 p.m.

Session Title: Dynamic Analysis of Spatial Structures II

Session Organizer: (Su-Duo XUE)

Chairs: Su-Duo XUE, Shiro KATO

Dynamic field test on elliptical suspen-dome

Jie QIN, Bin SHEN, Guoli LI (Beijing Building Construction Research Institute)*

Simulating blast effects in steel lattice structures

Emily LEIGH, Christopher EARLS (Cornell University)*

Dynamic analysis of single layer lattice shell with BRBs

Xiuli WANG, Jiyun CHEN, Chang WU (Lanzhou University of Technology)*

Nonlinear dynamic analysis of space frame structures

Chung-Yue WANG (National Central University, Taiwan), Ren-Zuo WANG (National Center for Research on Earthquake Engineering, Taiwan)*

Dynamic behaviors of two large spatial structures

Jinzhi WU, Yigang ZHANG, Xiaobing GENG (Beijing University of Technology)*

Investigation into the dynamic behaviour of double layer tensegrity systems

Behzad SHEKASTEHBAND, Karim ABEDI (Sahand University of Technology, Tabriz)*

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For multiple-author papers:

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Session T-3-C Thursday, May 29, 2:00-4:00 p.m.

Session Title: Spanning Between Theory and Practice I

Session Organizer: (Hiroki TAMAI)

Chairs: Hiroki TAMAI, Christopher EARLS

Keynote Lecture

Numerical tools in structure optimization

William BAKER, Alessandro BEGHINI, Juan CARRION, Aaron MAZEIKA, Arkadiusz MAZUREK (Skidmore, Owings & Merrill LLP)*

Design process, detailing and examples of non-traditional structures

Christian STUTZKI, Hiroki TAMAI, Joshua BUCKHOLT (Illinois Institute of Technology)*

Opportunities and risks with free-form design

Hans SCHOBER, Stefan JUSTIZ, Kai KUERSCHNER (Schlaich Bergermann and Partner LP)*

Novel space frame system based on Golden Ratio, 5-fold symmetry, and the fractal

HyperFrame system

Chris KLING, Hiroki TAMAI, Nicola D'SOUZA (Aurodyn, Inc.)*

Computation and design of the antenna structure – Tower One

Ajmal AQTASH, Neil KATZ (Skidmore, Owings & Merrill LLP)*

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For multiple-author papers:

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Session T-3-D Thursday, May 29, 2:00-4:00 p.m.

Session Title: Computational Models for Fracture and Degradation of Structures II

Session Organizers: (Günther MESCHKE, Jan ROTS)

Chairs: Günther MESCHKE, Jan ROTS

Fracture analyses of fiber-reinforced concrete structures

John BOLANDER (University of California, Davis)

Crack-centered enrichment for debonding in two-phase composite applied to textile reinforced concrete

Rostislav CHUDOBA, Jakub JEŘÁBEK, Frank PEIFFER, Joseph HEGGER (RWTH Aachen)*

Three-dimensional higher order X-FEM model for multifield durability and failure analysis of concrete structures

Stefan JOX, Christian BECKER, Günther MESCHKE (Ruhr University Bochum)*

From multi-scale to multi-grid FE analysis of concrete fracture

Chris J. PEARCE, Łukasz KACZMARCZYK, Nenad BIĆANIĆ (University of Glasgow)*

Analysis of thin layer ductile concrete as a seismic retrofit for masonry infill walls

Marios A. KYRIAKIDES, Sarah L. BILLINGTON (Stanford University)*

Mesosopic failure simulation of concrete and life-cycle computation of concrete structures

Kohei NAGAI, Koich MAEKAWA (University of Tokyo)*

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For multiple-author papers:

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Session T-3-E Thursday, May 29, 2:00-4:00 p.m.

Session Title: Developments and Applications of Beam and Rod Models I

Session Organizer: Carlos LÁZARO

Chairs: Carlos LÁZARO, Timothy HEALEY

Keynote Lecture

Finite rotation parameters in statics and in dynamics

Adnan IBRAHIMBEGOVIĆ (ENS Cachan), Boštjan BRANK (University of Ljubljana)*

An adaptive finite element code using linear Timoshenko beam elements and its applications

Daigoro ISOBE (University of Tsukuba)

The concept of hyper-beams in the analysis of slender members

Salvador MONLEÓN, Fernando IBÁÑEZ, Carlos LÁZARO, Alberto DOMINGO
(Universidad Politécnica de Valencia)*

A generalized concept of slenderness in the analysis of straight beams with constant cross-section

Salvador MONLEÓN, Fernando IBÁÑEZ, Alberto DOMINGO, Carlos LÁZARO
(Universidad Politécnica de Valencia)*

Element-free solution of geometrically exact rod elastostatics based on intrinsic (material) field variables

Carlos LÁZARO, Salvador MONLEÓN, Alberto DOMINGO (Universidad Politécnica de Valencia)*

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Session T-3-F Thursday, May 29, 2:00-4:00 p.m.

Session Title: New Optimization Techniques

Session Organizers: (Andrew BORGART, Edgar STACH)

Chairs: Andrew BORGART, Edgar STACH

Computational structural form finding and optimization of pneumatic structures

Andrew BORGART (TU Delft), Edgar STACH (University of Tennessee)*

Responsive building envelopes: Optimization for environmental impact

Patrick TEUFFEL (University of Leeds)

Using evolutionary computation to explore geometry and topology without ground structures

Peter VON BUELOW (University of Michigan)

Structural morphology and self-organization

Edgar STACH (University of Tennessee)

Feasibility of free-forms

Ivan MARKOV (The Chinese University of Hong Kong)

From nanostructure to mega stadiums

Gordana JAKIMOVSKA (Kohn Pederson Fox Associates)

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Session T-4-A Thursday, May 29, 4:30-6:10 p.m.

Session Title: Dynamics of Shells

Chairs: Karl-Heinz SCHWALBE, Robert HABER

A seismic analysis of a modular shell system

Youssef BELMOUDEN, Pierino LESTUZZI, Souad SELLAMI (École Polytechnique Fédérale de Lausanne)*

Earthquake analysis of cylindrical roof shells

Shadi OSTAVARI DAILAMANI, James G. A. CROLL (University College London)*

Interpretation of seismic response of cylindrical roof shells

Shadi OSTAVARI DAILAMANI, James G. A. CROLL (University College London)*

Dynamic cylindrical shell equations by power series expansions

Anders M. HÄGGLUND, Peter D. FOLKOW (Chalmers University of Technology)*

Dynamic equations for a homogenous, fully anisotropic, elastic plate

Karl MAURITSSON, Anders BOSTRÖM, Peter D. FOLKOW (Chalmers University of Technology)*

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For multiple-author papers:

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Session T-4-B Thursday, May 29, 4:30-6:10 p.m.

Session Title: Dynamic Analysis of Spatial Structures III

Session Organizer: (Su-Duo XUE)

Chairs: Su-Duo XUE, Shiro KATO

Keynote Lecture

Advances on seismic isolation in spatial structures

*Su-Duo XUE**, *Xiong-Yan LI (Beijing University of Technology)*

Dynamic analysis of cable roof networks under transient wind

*Sayed Ali GHAFARI OSKOEI**, *Ghyslaine McCLURE (McGill University)*

Wind-induced responses of Beijing National Stadium

*Qing-Shan YANG**, *Yu-Ji TIAN (Beijing Jiaotong University)*

Theoretical analyses for wind vibration response of reticulated shell structures

*De-min WEI**, *Jian-feng BIAN (South China University of Technology)*

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For multiple-author papers:

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Session T-4-C Thursday, May 29, 4:30-6:00 p.m.

Session Title: Spanning Between Theory and Practice II

Session Organizer: (Hiroki TAMAI)

Chairs: Hiroki TAMAI, Christopher EARLS

Determination of warping deformation limits for insulating glass units in cable net facades

*Hiroki TAMAI**, *Chris STUTZKI*, *Joshua BUCKHOLT*, *Mathew WEGLARZ* (*Stutzki Engineering, Inc.*)

Optimal design of unitized structures with curvilinear stiffeners

*Rakesh K. KAPANIA**, *Pankaj JOSHI*, *Manav BHATIA*, *Thi DANG* (*VPI&SU*)

Buckling analysis of Wuhan Railway Station

*Rongwei TANG**, *Pengfei ZHAO*, *Yong TAO*, *Guohua PAN*, *Jihong QIAN*, *Yixin DU* (*China Academy of Building Research*)

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For multiple-author papers:

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Session T-4-D Thursday, May 29, 4:30-6:30 p.m.

Session Title: Geometry and Mechanics

Session Organizers: (Kai-Uwe BLETZINGER, Fehmi CIRAK)

Chairs: Kai-Uwe BLETZINGER, Fehmi CIRAK

Keynote Lecture

Modeling and computation of patient-specific vascular fluid-structure interaction using Isogeometric Analysis

Yuri BAZILEVS, Victor M. CALO, Thomas J. R. HUGHES (University of Texas at Austin), Yongie ZHANG (Carnegie Mellon University)*

Keynote Lecture

Optimal shapes of mechanically motivated surfaces

Kai-Uwe BLETZINGER, Matthias FIRL, Johannes LINHARD, Roland WÜCHNER (TU Munich)*

Subdivision shells for nonsmooth and branching geometries

Quan LONG, Fehmi CIRAK (University of Cambridge)*

Water landing analyses with explicit finite element method

John T. WANG (NASA Langley Research Center)

On a geometrically exact contact description for shells: From linear approximations for shells to high-order FEM

Alexander KONYUKHOV, Karl SCHWEIZERHOF (University of Karlsruhe)*

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Session T-4-E Thursday, May 29, 4:30-6:15 p.m.

T-4-E Part I 4:30-5:10 p.m.

Session Title: Developments and Applications of Beam and Rod Models II

Session Organizer: Carlos LÁZARO

Chairs: Carlos LÁZARO, Timothy HEALEY

Adding local rotational degrees of freedom to ANC beams

*Ignacio ROMERO**, Juan J. ARRIBAS (*Universidad Politécnica de Madrid*)

Finite element modeling of Kirchhoff rods

Juan VALVERDE, *Francisco ARMERO** (*University of California, Berkeley*)

T-4-E Part II 5:10-6:15 p.m.

Session Title: Composites II

Chairs: *Rigoberto BURGUEÑO, S. Leigh PHOENIX*

Material layout optimization of natural fiber composite cellular panels

Rigoberto BURGUEÑO*, *Christina ISAAC* (*Michigan State University*)

Lamination parameter constraints for stacking sequence optimization of frp composites

Rigoberto BURGUEÑO*, *Jun WU* (*Michigan State University*)

Modeling biocomposites using laminate plate theory

*Sarah SCHRASS-CHRISTIAN**, Sarah BILLINGTON (*Stanford University*)

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Session T-4-F Thursday, May 29, 4:30-6:00 p.m.

Session Title: New Advances in Topology Optimization II

Session Organizers: (Gláucio H. PAULINO, Emílio SILVA)

Chairs: Gláucio H. PAULINO, Emílio SILVA

Keynote Lecture

Topology optimization method utilizing iterative solvers with subspace recycling applied to high-resolution electrical impedance tomography

*Luis Augusto Motta MELLO**, *Emilio Carlos Nelli SILVA* (University of São Paulo), *Eric DE STURLER* (Virginia Tech), *Gláucio H. PAULINO* (University of Illinois at Urbana-Champaign)

Topology optimization considering fabrication errors and length scale constraints

James K. GUEST (Johns Hopkins University)

A simple and effective inverse projection scheme for void distribution control in topology optimization

*Gláucio H. PAULINO** (University of Illinois at Urbana-Champaign), *Sylvia ALMEIDA* (Universidade Federal de Goiás), *Emilio Carlos Nelli SILVA* (University of São Paulo)

Design of dynamic laminate piezoelectric sensors and actuators using topology optimization

*Paulo Henrique NAKASONE**, *Emilio Carlos Nelli SILVA* (University of São Paulo)

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Session F-1-A Friday, May 30, 9:00 - 10:30 a.m.

Session	F-1 Room A: Statler Auditorium
Title	Plenary Lectures
Chair	Yeong Bin YANG, J. Robert COOKE
9:00 - 9:45	Computational morphogenesis: Its current state and possibility for the future <i>Hiroshi OHMORI (Nagoya University)</i>
9:45 - 10:30	Answers to three not quite straightforward questions in structural stability <i>Andreas STEINBOECK, Gerhard HOEFINGER, Xin JIA, Herbert A. MANG (TU Vienna)</i>

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For multiple-author papers:

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Session F-2-A Friday, May 30, 11:00 a.m.-12:30 p.m.

Session Title: Structural Stability I

Session Organizer: (Herbert MANG)

Chairs: Herbert MANG, William McGUIRE

Keynote Lecture

Limit-point and postbuckling behavior of steel trusses under thermal and mechanical loadings
*Yeong Bin YANG**, *T.J. LIN* (National Taiwan University)

Modeling thin-walled cold-formed steel members and systems

*Benjamin W. SCHAFER**, *R. H. SANGREE*, *Cristopher MOEN*, *M. SEIF*, *Y. SHIFFERAW*, *V. ZEINODDINI*, *Z. J. LI*, *O. IUORIO*, *Y. GUAN* (Johns Hopkins University)

Multi parametrical instability of straight bars

Jan B. OBREBSKI (Warsaw University of Technology)

The effect of predetermined delaminations on buckling and post-buckling behavior of spatial composite timber beams and frames

*Miran SAJE**, *Urban RODMAN*, *Dejan ZUPAN*, *Igor PLANINC* (University of Ljubljana)

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For multiple-author papers:

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Session F-2-B Friday, May 30, 11:00 a.m.-12:30 p.m.

Session Title: Computational Morphogenesis I

Session Organizers: (Makoto OHSAKI, Hiroshi OHMORI)

Chairs: Makoto OHSAKI, Hiroshi OHMORI

Keynote Lecture

Linear mixed integer programming for topology optimization of trusses and plates

*Makoto OHSAKI**, Ryo WATADA (Kyoto University)

Optimal design of glass grid shells with quadrilateral elements by means of a genetic algorithm

*Mario SASSONE**, Alberto PUGNALE (Politecnico di Torino)

Development of intelligent truss optimization system

*Seung-Chang LEE**, Jung-Keun OH (Samsung Corporation)

Shell surface with curved fold lines inspired by paper folding art

*Rohamezan ROHIM** (Universiti Teknologi MARA), Kok Keong CHOONG (Universiti Sains Malaysia), J. Y. KIM (Hyupsung University)

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Session F-2-C Friday, May 30, 11:00 a.m.-12:30 p.m.

Session Title: Multiphysics Simulation Environments for Shell and Spatial Structures I

Session Organizers: (Fehmi CIRAK, Ekkehard RAMM)

Chairs: Fehmi CIRAK, Ekkehard RAMM

Keynote Lecture

Advanced approaches for fluid-shell interaction

*Wolfgang A. WALL**, *Axel GERSTENBERGER*, *Ursula M. MAYER*, *Ulrich KÜTTLER (TU Munich)*

Numerical simulation of fluid-structure interaction for wind-induced dynamic response of the 3rd Jinan Yellow River cable-stayed bridge

*Qi-Lin ZHANG**, *Zhen-Hua LIU (Tongji University)*, *Ying ZHOU (Shandong University)*

A consistent finite element approximation for piezoelectric shell structures

*Dieter LEGNER**, *Sven KLINKEL*, *Werner WAGNER (University of Karlsruhe)*

Vibration analysis of thin-walled – gas or fluid filled – structures including the effect of the inflation/filling process

*Karl SCHWEIZERHOF**, *Marc HAßLER (University of Karlsruhe)*

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Session F-2-D Friday, May 30, 11:00-12:30 p.m.

Session Title: Finite Element Technology

Chairs: Jan ROTS, Phaedon-Stelios KOUTSOURELAKIS

On the propagation of pyrotechnical shocks into complex structures, taking medium frequencies into account

*Pierre LADEVÈZE**, *Guillaume BÉZIER*, *Hervé RIOU*, *HUGO LECLERC (ENS Cachan)*

Non-intrusive coupled global/local analysis of localized plasticity problems

*Lionel GENDRE**, *Olivier ALLIX*, *Pierre GOSSELET (ENS Cachan)*, *François COMTE (Snecma Villaroche)*

Re-triangulation of existing surface meshes with high curvatures

Antonio Carlos MIRANDA, *Luiz Fernando MARTHA** (PUC-Rio), *Paul WAWRZYNEK*, *Anthony INGRAFFEA (Cornell University)*

Mapping functions in the eight node elastodynamic infinite element with union shape function (EIEUSF)

Konstantin Savkov KAZAKOV (VSU "Luben Karavelov")

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Session F-2-E Friday, May 30, 11:00 a.m.-12:30 p.m.

Session Title: Structural Morphology

Chairs: Gláucio PAULINO, Anthony INGRAFFEA

Shape and size optimization of shell structures with variable thickness
*Saartje ARNOUT**, David DOOMS, Guido DE ROECK (K. U. Leuven)

Topological representation of natural and man-made structural forms
*Waldemar BOBER, Romuald TARCZEWSKI** (Wroclaw University of Technology)

The polyhedric configurations in spatial structures
Dimitra TZOURMAKLIOTOU (Democritus University of Thrace)

Analytical and computational form-finding
David M. COOPER (independent)

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For multiple-author papers:

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Session F-3-A Friday, May 30, 2:00-4:00 p.m.

Session Title: Structural Stability II

Session Organizer: (Herbert MANG)

Chairs: Herbert MANG, William McGUIRE

Keynote Lecture

Buckling and sensitivity analysis of imperfect shells involving contact

Karl SCHWEIZERHOF, Eduard EWERT (University of Karlsruhe)*

Keynote Lecture

Determining the stability of tensegrities and generic global rigidity

Robert CONNELLY (Cornell University)

Initial imperfection identification in shell buckling problems

Christopher J. STULL, Christopher J. EARLS, Wilkins AQUINO (Cornell University)*

Buckling phenomena, analysis and design of axially compressed cylindrical shells with co-existent external pressure

Werner GUGGENBERGER, Medhanye B. TEKLEAB (TU Graz)*

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For multiple-author papers:

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Session F-3-B Friday, May 30, 2:00-4:00 p.m.

Session Title: Computational Morphogenesis II

Session Organizers: (Makoto OHSAKI, Hiroshi OHMORI)

Chairs: Makoto OHSAKI, Hiroshi OHMORI

Modeling of clothing and interactions with the body using continuum degenerated shell finite elements

Colby C. SWAN, Xiaolin MAN, Rob W. WILLIAMS (University of Iowa)*

Bifurcation analysis for the multi-folding structures

Ichiro ARIO (Hiroshima University), Masatoshi NAKAZAWA (Tohoku Gakuin University), Andrew WATSON (Loughborough University)*

Structural behaviour of shell surface in the form of Möbius strip

Kok Keong CHOONG, Min Sheng KUAN, (Universiti Sains Malaysia)*

On the interaction between architecture and engineering: the acoustic optimization of a reinforced concrete shell

Mario SASSONE (Politecnico di Torino), Tomàs MENDEZ (Caracas, Venezuela), Alberto PUGNALE (Politecnico di Torino)*

Singularities

Peter MACAPIA (Pratt Institute/Columbia University), Frank BITONTI, Robert BAKER, Charles KWAN (Pratt Institute)*

Optimal structural shapes for shells using hybrid GA

Nidur SINGH, C.V. RAMAKRISHNAN, D.K. SEHGAL (IIT Delhi)*

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Session F-3-C Friday, May 30, 2:00-4:00 p.m.

Session Title: Multiphysics Simulation Environments for Shell and Spatial Structures II

Session Organizers: (Fehmi CIRAK, Ekkehard RAMM)

Chairs: Fehmi CIRAK, Ekkehard RAMM

Thin-walled structures interacting with incompressible flows

*Ekkehard RAMM**, *Malte VON SCHEVEN* (University of Stuttgart), *Christiane FÖRSTER*, *Wolfgang A. WALL* (TU Munich)

Full SPH modeling of the dynamic failure of shells filled with a fluid

*Alain COMBESURE** (LaMCoS), *Farid ABED MERAIM* (LPMM), *Bertrand MAUREL* (LaMCoS)

Fluid-shell coupled simulation of supersonic disk-gap-band parachutes

Konstantinos KARAGIOZIS, *Ramji KAMAKOTI*, *Carlos PANTANO* (University of Illinois at Urbana-Champaign), *Fehmi CIRAK** (University of Cambridge)

Strongly coupled approach for the treatment of the fluid-structure interaction problems involving highly deformable solids and shells

*Riccardo ROSSI**, *P. RYZHAKOV*, *Eugenio OÑATE* (CINME, UPC)

Numerical simulation of fluid-structure interaction for wind-induced dynamic response of cylindrical steel tanks with a dome roof

*Qi-Lin ZHANG**, *Zhen-Hua LIU* (Tongji University), *Ying ZHOU* (Shandong University)

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Session F-3-D Friday, May 30, 2:00-4:00 p.m.

Session Title: Deployable Structures and Biological Morphology

Session Organizers: (Hiroshi FURUYA, Hidetoshi KOBAYASHI)

Chairs: Hiroshi FURUYA, Hidetoshi KOBAYASHI

Keynote Lecture

Unfolding of potato flower as a deployable structure

*Hidetoshi KOBAYASHI**, Keitaro HORIKAWA(Osaka University), Yoshinori MORITA
(Kawasaki Heavy Industries, Ltd.)

Structural analysis for the multi-folding and deployable structures

Masatoshi NAKAZAWA (Tohoku Gakuin University), Ichiro ARIO* (Hiroshima University),
Andrew WATSON (Loughborough University)

Deployment schemes for 2-D space apertures and mapping for bio-inspired design

*Christopher H. JENKINS**, Jeffery J. LARSEN (Montana State University)

Microstructure of foldable membrane for gossamer spacecrafts

*Hiroshi FURUYA**, Yasutaka SATOU, Yosuke INOUE, Tadashi MASUOKA (Tokyo Institute
of Technology)

Natural twist buckling in shells: From the hawkmoth's bellows to the deployable *Kresling-*
pattern and cylindrical *Miura-ori*

Biruta KRESLING (Experimental Design and Bionics, Paris)

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Session F-3-E Friday, May 30, 2:00-4:00 p.m.

Session Title: Advances in the Optimization and Form-finding of Tensegrity Structures

Session Organizer: (Gunnar TIBERT)

Chairs: Gunnar TIBERT, Ruy Marcelo PAULETTI

Keynote Lecture

Optimal tensegrity structures in bending

*Robert SKELTON**, *Mauricio de OLIVEIRA (University of California, San Diego)*

Reciprocal diagrams and stress control of tensegrity systems

Andrea MICHELETTI (University of Rome "Tor Vergata")

Bending-stiff tensegrity masts: Do they exist?

*Gunnar TIBERT** (*KTH, Royal Institute of Technology*)

A tensegrity catalogue using point group theory

*R. PANDIA RAJ, Simon D. GUEST** (*University of Cambridge*)

Form finding analysis of tensegrity membrane structures based on variational method

*Mizuki SHIGEMATSU**, *Masato TANAKA, Hirohisa NOGUCHI (Keio University)*

Tensegrity architecture calculation of the cellular cytoskeleton

*Bernard MAURIN**, *Patrick CAÑADAS, René MOTRO (Université Montpellier 2)*

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Session F-4-A Friday, May 30, 4:30 - 6:15 p.m.

Session	F-4 Room A: Statler Auditorium
Title	Plenary Lectures and Closing
Chair	Manfred BISCHOFF, John ABEL
4:30 - 5:15	Rigid mechanics and its role in nonlinear structural analysis <i>Yeong Bin YANG (National Taiwan University)</i>
5:15 - 6:00	Folding and deployment of stored-energy composite structures <i>Sergio PELLEGRINO (Cal Tech)</i>
6:00 - 6:15	Closing Remarks John ABEL, Organizing Chair & President of IASS

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