

Structural Membranes 2023

Technical Programme

Monday, 02/10/2023

Mon, 02/10/2023 08:30 - 09:45
MOm - RE - Registration

Mon, 02/10/2023 09:45 - 10:15
MOm - OP - Welcome & Opening ceremony

Salón de Actos

Mon, 02/10/2023 10:15 - 11:00
MOm - PL1 - Plenary Session I - Girma Bitsuamlak
Chaired by: Prof. Roland Wüchner (Technische Universität Braunschweig)

Salón de Actos

Recent experimental and computational advances to assess wind effects on flexible structures

Mon, 02/10/2023 11:00 - 11:30
Coffee Break

Mon, 02/10/2023 11:30 - 13:00
MOm - IS01 Detailing – Adaptive and Retractable
Chaired by: Mr. Christoph Paech (schleich bergemann partner - sbp)

Salón de Actos

A folding cover on the Suzanne Lenglen court, Roland-Garros, Paris
B. VAUDEVILLE*, S. Aubry
Customised Fibre Panels: A New Tool for Architectural Applications
L. Blandini*
Urban retractable roofs
N. Kugel*
Experiences after 10 Years of Operation and Maintenance of the Retractable Roof at BC Place
F. Weller*, N. Montpetit
Drive system innovation – winch development for moveable membrane structure
M. Jenni*
Technical evolution of a convertible pool roof on three expedition cruise ships for the shipping company Hapag Lloyd
A. Hub*, A. Rein

Mon, 02/10/2023 11:30 - 13:00
MOm - IS11 Fluid-structure Interaction and Wind Engineering
Chaired by: Prof. Roland Wüchner (Technische Universität Braunschweig)

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Towards Embedded Fluid-Structure Interaction Simulations Based on CAD-Integrated Thin-Walled Structures
R. Aristio*, R. Wüchner
The effect of prestress levels and of geometric scale on the aeroelastic behaviour of double-curved membrane roofs
A. Kodakkal*, G. Martínez-López, M. Péntek, K. Sautter, A. Goldbach, K. Bletzinger
Investigating wind loading for standardizing purposes on representative double-curved freestanding membrane roof canopies
G. Martínez-López*, A. Kodakkal, M. Péntek, K. Sautter, A. Goldbach, K. Bletzinger
Short-term Prediction of Wind Speed based on Frequency Decomposition and ANN
B. Yang*, H. Zhu, Q. Zhang, J. Qiu, R. Wüchner
A Numerical Technique for Modelling Hypersonic Inflatable Shields
V. Orlandini, R. Paciorri, **A. Assonitis***, F. Saltari, F. Mastroddi, A. Bonfiglioli

Mon, 02/10/2023 13:00 - 14:15
Lunch Break

Mon, 02/10/2023 14:15 - 15:15
MOa - PL2 - Plenary Session II Kai-Uwe Bletzinger + AMA Awards
Chaired by: Prof. Eugenio Oñate (Universitat Politècnica de Catalunya)

Salón de Actos

50 Years of Form Finding by the Force Density Method

Mon, 02/10/2023 15:15 - 15:45
Coffee Break

MOa - - IS02 Detailing – Case Studies – Installation Process

Chaired by: Prof. Günther H. Filz (A*SA, Aalto University, Finland // LSU, LightweightStructures Unit, Universität Innsbruck, Austria), Prof. Josep Ignasi de LLORENS DURAN (UPC, School of Architecture, Barcelona, Spain)

Detailing of Tensile Architecture and the Adoration of the Joint

N. Goldsmith*

PumpItUp, gite mobile for the European cultural capital Esch-sur-Alzette

B. Stimpfle*

Medijana-Niš Archeological Site Protection Structure

A. Vučur*, G. Filz

Design and installation of a large pneumatic dome in Brazil

R. Pauletti*, C. Bauer

Unusual design drivers for membrane structures and details

G. Ramirez Lares*, G. Filz

Case Study: Santiago Bernabéu Stadium

K. Bernert*

Creating a meeting space for people – a new roof for the SMS Campus in Mönchengladbach, Germany

T. Hermeking*

Designing A Large Span Structures Under Seismic Loading – A Case Study

F. DANSIK*, M. SAHIN, N. SAMAT

MOa - - IS03 Energetic Issues / IS09 Circularity

Chaired by: Prof. Jianhui Hu (Shanghai Jiao Tong University), Prof. Carol Monticelli (Politecnico di Milano)

Thermal Performance of Membrane Structures Integrated Phase Change Materials

J. Zhou, **J. Hu***, W. Chen

Experimental investigations on Structural Behaviour of Two-layer-stacked ETFE film Square Planar Structure Under Normal Pressure Loading

W. Chen*, X. Zhao, J. Cai, H. Wang, G. Han

Assessing the life cycle of temporary membrane structures based on two case studies

Z. Eryuruk*, M. Mollaert, L. De Laet, D. Van Hemelrijck

Re-manufacturing textiles within circular economy: trials of closing the loops of Textile-based Tertiary Architecture

A. Zanelli*, C. Monticelli

HydroSKIN: Climate-resilient Membrane Façade Prototyping

C. Eisenbarth*, W. Haase, L. Blandini, W. Sobek

Life Cycle Assessment of Building ETFE Cushion for Circular Economy

Q. Li*, C. Monticelli, A. Zanelli

Optimization of the design phase and the End of Life scenarios of Textile Façade Retrofit interventions

G. Procaccini*

Revaluation of recycled reinforcement fibers through innovative textile technologies for developing new thermoplastic composites

I. Domenech*

Welcome Reception

Tuesday, 03/10/2023

Tue, 03/10/2023 09:00 - 10:00

Salón de Actos

TUm - PL3 - Plenary Session III - Carol Monticelli

Chaired by: Ms. Katja Bernert (Mehler Technologies GmbH)

Thinking to close the loop in membrane architecture

Tue, 03/10/2023 10:00 - 11:00

Salón de Actos

TUm - PL4 - Plenary Session IV - Pierluigi D'Accunto

Chaired by: Ms. Katja Bernert (Mehler Technologies GmbH)

Form-finding of lightweight tension-compression structures with equilibrium-based graphical methods

Tue, 03/10/2023 11:00 - 11:30

Coffee Break

Tue, 03/10/2023 11:30 - 13:00

Salón de Actos

TUm - - IS07 Structural and Motion Planning / Applications

Chaired by: Dr. Sudarshan Krishnan (University of Illinois at Urbana-Champaign)

Operational Planning and Design Issues for Retractable Membrane Roofs

D. Campbell*

Similar design of retractable roof in two different sizes – identical motion planning?

M. Jenni*

move it and fold it!

C. Paech*

Development of Air-inflated Lifting Equipment

K. Hincz*

Structural Membrane of Levante Stadium Cable Roof

E. Montes, A. Solar, I. Sanchez, **J. Llarena***, A. Bilbao

Main Canopy of Islamic Complex, Putrajaya, Malaysia – A Testimony to Excellent Performance of PTFE Membrane under Tropical Climate

M. Sing*, K. Choong, A. Che Malid, C. Ng

Tue, 03/10/2023 11:30 - 13:00

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TUm - - IS08 Membranes and Energy Harvesting

Chaired by: Prof. Rosemarie Wagner (KIT)

Large Span Membrane Architecture: How to Accomplish Carbon Neutral with Innovative Photovoltaic and Adaptive Control Strategy

Y. Yan*, W. Chen, J. Hu, R. Wagner

Self-cooling textiles – energy-free method using radiative cooling technology

L. Zimmermann*, C. Kaya, T. Stegmaier, G. Gresser

Floating membrane roofs for large zootechnical and industrial storage tanks

P. Beccarelli*, R. Maffei, A. Giordano, F. Natta

Thermodynamic and structural Behaviour of textile Covers for Biogas Storage Systems

K. Heinlein*, R. Wagner

Membrane attached Photovoltaics

L. Tippmann*

Tue, 03/10/2023 13:00 - 14:15

Lunch Break

Tue, 03/10/2023 14:15 - 15:15

Salón de Actos

TUa - PL5 - Plenary Session V -Qilin Zhang + EIC Projects

Chaired by: Mr. Riccardo Rossi (CIMNE-UPC)

Tue, 03/10/2023 15:15 - 15:45

Coffee Break

Tue, 03/10/2023 15:45 - 17:15

Salón de Actos

TUa - - IS10 Parametric Design of Tensile and Membrane Structures

Chaired by: Dr. Kazuki Hayashi (Kyoto University)

Mean curvature flow for generating triangular meshes with piecewise constant mean curvatures

K. Hayashi*, Y. Jikumaru, M. Ohsaki, T. Kagaya, Y. Yokosuka

BATS - A software for the parametric design of membrane structures

M. Souza, **R. Pauletti***

Dancing Tent: Computational Structural Modeling and Choreographic Approach for the Kinetic Design of a Tent Structure

I. Rian*, K. Nguyen

Simulation Calibration Of Differentiated Knitted Membranes With Evolutionary Optimisation Tools

Y. Sinke*, M. Tamke, M. Ramsgaard Thomsen

TUa - IS06 New Findings and Products

Chaired by: Prof. Karsten Moritz (IMS BAUHAUS® Archineer® Institutes e.V.)

Failure of ETFE Film Membrane

D. Karádi*, D. Hegyi

Tensile Behaviour of ETFE Foils with Various Types of Area Weld Seams

D. Runge*, J. Uhlemann, N. Stranghöner

Practical implementation of a thermo visco elastic material model for the design and analysis of ETFE structures

A. Cabello*, A. Bown

Comparative Assessment Of Life Cycle Aspects Of Lightweight And Conventional Structures And Their Integration Into An Educational Approach

H. Boegner-Balz, **S. Von der Weth***, K. Moritz

The Determination of the Mechanical Performance of Membrane Structures in Architectural Applications

C. Maywald*, T. Balster

On the long-term behavior of ETFE foils - evaluation of monoaxial creep tests after one hundred thousand hours

K. Moritz*, G. Müller, F. Goecke

Social programme + Conference banquet

Wednesday, 04/10/2023

Wed, 04/10/2023 09:00 - 09:45

Salón de Actos

WEm - PL6 - Plenary Session VI - Paolo Beccarelli

Chaired by: Dr. Kai-Uwe Bletzinger (Technische Universität München, Germany)

The Evolution in the Design Tools for Membrane Structures

Wed, 04/10/2023 09:45 - 11:00

Salón de Actos

WEm - - IS04 Numerical Methods and Modeling (I)

Chaired by: Dr. Ann-Kathrin Goldbach (Technical University Munich)

The calculation of equidistant cable-nets

J. Holl*, P. Singer

Enhanced design and modelling productivity with Parametric design

H. Nawaz*

Does the stress-strain behaviour of PTFE-coated glass fibre fabrics depend on the load history?

J. Uhlemann*, N. Stranghöner

Design and Construction of an Asymptotic Geodesic Timber Gridshell

E. Schling*, Z. Wan, P. D'Acunto

Correlation between uniaxial and biaxial creep behaviour of ETFE foils

F. Surholt*, J. Uhlemann, N. Stranghöner

Wed, 04/10/2023 09:45 - 11:00

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WEm - - IS05 The Application of Membranes For: Tensairity, ETFE...

Chaired by: Dr. Arno Pronk (Eindhoven University of Technology)

Buoycrete, a light-weight concrete in combination with a membrane mold Keynote

A. pronk*, G. Visch

Experimental Study on Precise Forming of Inflated Membrane Structure Using Airship Membrane Material

S. Shen*, Y. Pang, J. Gong, G. Qiu

Thermomechanical characterisation and linear viscoelastic modelling of ETFE membranes

A. Comitti*, F. Bosi

An Analytical Method for Precise Forming of Membrane Structure Considering the Spindle Direction of Membrane Material

Y. Pang*, S. Shen, G. Qiu, J. Gong

Design and wind-induced response experiments of tensioned membrane radome

Q. Zhang*, J. Cai

Wed, 04/10/2023 11:00 - 11:30

Coffee Break

Wed, 04/10/2023 11:30 - 13:00

Salón de Actos

WEm - - IS04 Numerical Methods and Modeling (II)

Chaired by: Dr. Ann-Kathrin Goldbach (Technical University Munich)

Shape-adaptive Climate Loading of Tensile Surface Structures

Z. Zajac*, R. Lang, I. Némec

Computational sensitivity analysis of hybrid lightweight structures

M. Fußeder*, T. Oberbichler, K. Bletzinger

Tracing non-linearities in the load bearing behavior of structural membranes: an investigation of typical shapes and load cases

A. Goldbach*, K. Bletzinger

Shaping Steel Grid Shells by Applying a Visual Programming Language

J. Dzwierzynska*

A new numerical model for deployment process of inflatable aerodynamic decelerator based on the reverse modelling technique and control volume method

Q. Lei*, X. Wang, Y. He, H. Yang

A mixed variational formulation for the form finding of flexible structures

M. Cuomo*, R. Ruggieri, L. Greco

Wed, 04/10/2023 11:30 - 13:00

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WEa - Design Methods / Climate Impact / Materials

Between R&D and Architecture

N. Baldassini, K. De Rycke, O. Guidet*

Beyond bending: tension. Membrane structures II

J. Llorens*

Between Structure and Architecture

N. BALDASSINI*, O. GUIDET, K. DE RYCKE

ATLAS architectural membrane as a core element for larger and energy efficient air domes

A. Sonnenberg*

Architecture for pigs

M. Durka*

Plektotonik - Structural textile membrane from fast growing and formable trees (SRC)

N. Singer, N. Miodragovic*, D. Suarez, K. Wolff, T. Kendir

Wed, 04/10/2023 13:00 - 13:15

Salón de Actos

WEa-CL - Closure

Wed, 04/10/2023 13:15 - 14:30

Lunch Break