



UNIVERSITY OF CAPE TOWN



The Ninth International Conference on Structural Engineering, Mechanics and Computation

Cape Town, South Africa, 1-3 September 2025

FINAL PROGRAMME

Welcome Reception: Sunday 31 August

Southern Sun Cape Sun Hotel, 23 Strand Street, City Centre, Cape Town

- 16:00-18:00 Onsite Registration & Collection of Conference Bags
- 17:00-17:10 Welcome by the Conference Chair (Prof. Alphose Zingoni)
- 17:10-18:00 Conference Welcome Reception

Opening Session: Monday 1 September

Southern Sun Cape Sun Hotel, 23 Strand Street, City Centre, Cape Town

- 07:30-10:00 Onsite Registration & Collection of Conference Bags
- 07:30-08:00 Arrival Tea and Coffee
- 08:00-08:15 Introductory Remarks by the Conference Chair (Prof. Alphose Zingoni)
- 08:15-08:30 Welcome by the UCT Vice-Chancellor (Prof. Mosa Moshabela)
- 08:30-10:00 Keynote Lectures

Conference Dinner: Tuesday 2 September

Kelvin Grove Club, 144 Campground Rd, Newlands, Cape Town: 19:00-22:00

Plenary & Parallel Sessions: Monday 1 – Wednesday 3 September

Southern Sun Cape Sun Hotel, 23 Strand Street, City Centre, Cape Town

General Programme Structure

- 08:00-08:30 Tue & Wed: Arrival Tea and Coffee
- 08:30-10:00 Mon, Tue & Wed: Plenary Session
- 10:00-10:30 Tea & Coffee Break
- 10:30-12:30 Mon, Tue & Wed: Parallel Sessions: 5 Streams (A to E)
- 12:30-13:30 Lunch Break
- 13:30-15:00 Mon, Tue & Wed: Parallel Sessions: 5 Streams (A to E)
- 15:00-15:30 Tea & Coffee Break
- 15:30-17:00 Mon, Tue & Wed: Parallel Sessions: 5 Streams (A to E)

General Note

The four timetable periods of the Conference, from 1 to 3 September 2025, will be denoted as follows:

Period 1: 08:30-10:00; Period 2: 10:30-12:30; Period 3: 13:30-15:00; Period 4: 15:30-17:00

Plenary sessions will run in Period 1. Parallel sessions will run in Periods 2, 3 and 4.

Plenary Presentations: Keynote Lectures

Monday 1 September 2025: Period 1

Co-Chairs: Prof. G. De Roeck, KU Leuven, Belgium & Prof. U. Galvanetto, Univ. of Padua, Italy

08:30-09:15 Beyond deployables: Robotic assembly of space structures

Professor Sergio Pellegrino, California Institute of Technology, USA

09:15-10:00 Analytical modelling of structural instabilities: Recent developments and outlook

Professor Ahmer Wadee, Imperial College London, UK

Tuesday 2 September 2025: Period 1

Chair: Prof. R. Stroetmann, TU Dresden, Germany

08:30-09:15 Predicting strength of butt-welded joints of high-strength steel

Professor Guo-Qiang Li, Tongji University, China

09:15-10:00 Optimization of macro-synthetic fibre-reinforced concrete as alternative railway sleepers

Professor Olivia Mirza, Western Sydney University, Australia

Wednesday 3 September 2025: Period 1

Chair: Prof. M. Kaliske, TU Dresden, Germany

08:30-09:15 Fibre-reinforced high-performance concrete at low cycle fatigue: Modelling of damage

Professor Jörg Schröder, University Duisburg-Essen, Germany

09:15-10:00 Lessons from vibration-based structural health monitoring of bridges: Insights and applications

Professor Chul-Woo Kim, Kyoto University, Japan

Parallel Session Presentations

Monday 1 September, Tuesday 2 September, Wednesday 3 September: Periods 2, 3 & 4

Five streams of parallel presentations (each allocated its own venue) will run throughout the Conference.

These streams are broadly defined in terms of the topics covered, as follows:

STREAM A: Structural Dynamics; Dynamic Response; Vibration Analysis; Vibration Control; Fluid-Structure Interaction; Seismic Analysis; Seismic Response; Seismic Design; Buckling of Structures; Shells & Plates; Spatial Structures; Shape Optimisation

STREAM B: Steel Structures; Steel Connections; Steel-Concrete Composite Structures; Concrete-Filled Tubes; High Strength Steel; High Performance Steel; Stainless Steel; Aluminium Structures; Sustainable Construction; Green Technology; Reuse of Materials and Structures

STREAM C: Reinforced Concrete; Prestressed Concrete; Mechanics of Concrete; High Strength Concrete; High Performance Concrete; Fibre-Reinforced Concrete; FRP Composites; Cement-Based Materials; Construction Materials; Timber Structures; Mechanics of Wood

STREAM D: Computational Mechanics; Material Modelling; Numerical Simulations; Numerical Modelling; Damage Mechanics; Fracture; Fatigue; Blast; Biological Tissue; Biomedical Engineering; Additive Manufacturing; 3D Printing; Machine Components; Kinematics; Soil-Structure Interaction; Foundations; Geotechnical Engineering; Tunnelling; Underground Structures

STREAM E: Structural Optimization; Reliability; Safety; Structural Design Philosophy; Risk & Vulnerability; Wind Load; Wind Power Plants; Machine Learning; Digital Twinning; Building Performance; Glass Structures; Bridge Analysis; Bridge Design; Structural Health Monitoring; Inspection; Damage Detection; Damage Identification; Structural Assessment; Maintenance; Rehabilitation

MATRIX OF SEMC 2025 PARALLEL SESSIONS

In the detailed Programme, the 45 parallel sessions are numbered in the format **S-DN**. With reference to the matrix below, parallel session **S-DN** lies at the intersection of the column for Stream **S** and the row for Day-Period **DN**, where **S** is A, B, C, D or E; **D** is M, T or W; **N** is 2, 3 or 4.

	Stream A	Stream B	Stream C	Stream D	Stream E
Mon 01 Sept 10:30-12:30 [Day-Period M2]	A-M2: Structural Dynamics; Vibration Response; Vibration Control - I <i>SS17: Environmental Vibrations</i>	B-M2: Steel Structures; Steel Connections - I	C-M2: High Strength Concrete; High Performance Concrete; Fibre-Reinforced Concrete	D-M2: Railway Tracks; Foundations; Tunnelling	E-M2: Wind Power Plants; Wind Load; Safety; Risk & Vulnerability; Machine Learning
Mon 01 Sept 13:30-15:00 [Day-Period M3]	A-M3: Structural Dynamics; Vibration Response; Vibration Control - II	B-M3: Steel Structures; Steel Connections - II	C-M3: Reinforced Concrete; Prestressed Concrete - I <i>SS05: Mechanics of Reinforced Concrete</i>	D-M3: Soil-Structure Interaction; Foundations; Geotechnical Engineering - I	E-M3: Structural Optimization; Structural Reliability; Machine Design
Mon 01 Sept 15:30-17:00 [Day-Period M4]	A-M4: Kinematics; Mechanisms; Fluid-Structure Interaction; Buckling of Structures I	B-M4: Steel Structures; Steel Connections - III	C-M4: Reinforced Concrete; Prestressed Concrete - II	D-M4: Additive Manufacturing <i>SS07: Reducing the Carbon Footprint of Steel Structures</i>	E-M4: Digital Twinning; Building Performance; Housing
Tue 02 Sept 10:30-12:30 [Day-Period T2]	A-T2: Buckling of Structures II	B-T2: High Strength Steel; High Performance Steel <i>SS18: High Strength Steel</i>	C-T2: Structural Applications of FRP Composites - I <i>SS08: FRP Composites in Civil Engineering Structures</i>	D-T2: Soil-Structure Interaction; Foundations; Geotechnical Engineering - II <i>SS09: Renew. Energy Structures</i>	E-T2: Struct. Health Monitoring, Damage Detect. & Identification I <i>SS12: Modern Technologies for Infrastructure Maintenance</i>
Tue 02 Sept 13:30-15:00 [Day-Period T3]	A-T3: Buckling of Structures III	B-T3: Stainless Steel & Aluminium Structures <i>SS03: Stainless Steel Connections</i>	C-T3: Structural Applications of FRP Composites - II <i>SS08: FRP Composites in Civil Engineering Structures</i>	D-T3: Damage Modelling; Fracture & Fatigue I	E-T3: Struct. Health Monitoring, Damage Detect. & Identification II <i>SS02: Structural Health Monitoring & Damage Identification</i>
Tue 02 Sept 15:30-17:00 [Day-Period T4]	A-T4: Shells & Plates	B-T4: Steel-Concrete Composite Structures	C-T4: Structural Applications of FRP Composites - III <i>SS08: FRP Composites in Civil Engineering Structures</i>	D-T4: Fracture & Fatigue II; Blast & Impact	E-T4: Glass Structures <i>SS15: Structural Applications of Glass</i>
Wed 03 Sept 10:30-12:30 [Day-Period W2]	A-W2: Seismic Response; Seismic Design - I	B-W2: Sustainable Construction; Reuse of Materials and Structures - I <i>SS14: Reuse of Steel Structures</i>	C-W2: Timber Structures; Timber Technology <i>SS19: Modern Timber Engineering in a Changing World</i>	D-W2: Computational Mechanics; Material Modelling; Numerical Simulations <i>SS04: Multiscale Models of Materials</i>	E-W2: Structural Assessment; Rehabilitation
Wed 03 Sept 13:30-15:00 [Day-Period W3]	A-W3: Seismic Response; Seismic Design - II	B-W3: Sustainable Construction; Reuse of Materials and Structures - II	C-W3: Mechanics of Wood; Construction Materials I <i>SS21: Fracture of Wood and Timber Structures</i>	D-W3: Numerical Modelling; Biomedical Engineering I <i>SS23: Mechanical Characterization of Soft Tissues</i>	E-W3: Historic Structures; Masonry Structures
Wed 03 Sept 15:30-17:00 [Day-Period W4]	A-W4: Spatial Structures; Shape Optimisation	B-W4: Sustainable Construction; Reuse of Materials and Structures - III	C-W4: Cement-Based Materials; Construction Materials II	D-W4: Biomedical Engineering II <i>SS23: Mechanical characterization of Soft Tissues</i>	E-W4: Bridge Analysis, Design & Construction

Programme for Parallel Sessions

The Programme for Parallel Sessions is presented below, stream by stream. The session code has 4 characters: the first is a letter indicating the **Stream** (A, B, C, D or E), the second is a hyphen, the third is a letter indicating the **Day** (M: Mon; T: Tue; W: Wed), and the fourth is a number indicating the **Period** (2, 3 or 4). For example, D-T3 denotes the parallel session of Stream D that runs on Tuesday in Period 3 (13:30-15:00). Period 1 (08:30-10:00) is reserved for Plenary Sessions. Excluding the Plenary Sessions, the Programme features a total of 45 Parallel Sessions.

STREAM A

A-M2: Structural Dynamics; Vibration Response; Vibration Control - I

Includes contributions to Special Session SS17: Environmental Vibrations. Organisers: Prof. Lars Vabbersgaard Andersen, Aarhus University, Denmark; Dr. Peter Persson, Lund University, Sweden

Chair: Prof. L.V. Andersen, Aarhus University, Denmark

10:30: Tunable sound absorption and energy absorption of origami-inspired metastructures, Z.R. Shao, Y. Chen, P. Shi, J.L. Wei, J. Feng, P. Sareh **(Invited Paper)**

11:00: Vibration reduction in cross-laminated timber panels by using integrated elastomer layers, A. Bohman, L. Andersson, K. Persson, P. Persson

11:15: Vibration prediction and mitigation for urban railways structurally integrated with residential buildings, A. Parodi

11:30: Experimental analysis of collective human motion in running activities, J. Lottefier, P. Van den Broeck, K. Van Nimmen

11:45: Train-induced vibrations in cross-laminated timber buildings: A parametric study, K.A. Ung, F. Rasmussen, L. Andersson, P. Bucinskas, L.V. Andersen, J.-G. Kim, P. Persson

12:00: Comparison of analytical methods and field measurements for evaluating the insertion loss of railway vibration mitigation products, I.E. Martos, A. Parodi

12:15: Vibration reduction in cross-laminated timber panels by using individual concrete lamellae, K.A. Ung, A. Bohman, L. Andersson, S. Johansson, L.V. Andersen, P. Persson

A-M3: Structural Dynamics; Vibration Response; Vibration Control - II

Co-Chairs: Prof. H. Bouchair, Clermont Auvergne Univ., France; Prof. T. Haas, Univ. of Stellenbosch, RSA

13:30: Control of the dynamic response of bridges through movable shear keys, A.J. Kappos **(Invited Paper)**

14:00: Measurement for pedestrian-induced vibration of the irregular spanned ring footbridge, T. Monzen, R. Yoshikawa, C. Qianghua

14:15: The bi-tuned semi-active TMD for tall buildings under multi-hazard loads, S. Kleingesinds

14:30: A study into engine- and propeller-induced vibration of a ro-ro vessel by the finite element method, N. Vladimir, I. Senjanović, Z. Wei

14:45: Numerical analysis of vibration characteristics in irregularly spanned ring-shaped footbridge, Q. Cai, T. Monzen

A-M4: Kinematics; Mechanisms; Fluid-Structure Interaction; Buckling of Structures I

Co-Chairs: Prof. P.B. Goncalves, PUC-Rio, Brazil; Prof. H. Pasternak, BTU Cottbus, Germany

15:30: The dynamic response of non-rigid linkage mechanisms using the Lagrangian approach, C.C. Gai, K.A. Seffen

15:45: Design of kinematic mechanism of morphing wing with functionally gradient metamaterial skin, J. Bajer, M. Hrstka, Z. Hadas, Z.S. Khodaei, M.H. Aliabadi

16:00: Leveraging flexibility in the design of a wave energy converter: Strongly coupled two-way FSI numerical modeling and experimental wave tank testing, J. Andersen, F. Ferri, C. Eskilsson, S.G. Thomsen, M. Folley

16:15: Contribution to lateral torsional buckling of girders with rotational restraints, A. Müller, A. Taras, M. Vild

16:30: Shear buckling of sinusoidal corrugated web beams with reinforced openings, H. Pasternak, Z. Li

16:45: Buckling behaviour of thin concrete arch dams, M.D. Letsika, A. Zingoni

A-T2: Buckling of Structures II

Chair: Prof. M.A. Wadee, Imperial College London, UK

10:30: Plastic bifurcation of rectangular plates under uniaxial and biaxial loadings, S. Shrivastava (**Invited Paper**)

11:00: On the elastic flexural-torsional buckling of straight members and arches, M.A. Gizejowski, J.P. Papangelis (**Invited Paper**)

11:30: A path-following approach for complete analyses of structural instability phenomena, A. Köllner

11:45: Buckling and stability of a rod deforming on a tubular surface with rigorous treatment of static friction, G.H.M. van der Heijden

12:00: Nonlinear buckling and vibration analysis of thin-walled fiber reinforced polymer I-section beams, P.B. Gonçalves, D. Orlando

12:15: Buckling analysis of composite box girders using generalized beam theory (GBT) and Ritz method, N. Kharghani, C. Mittelstedt

A-T3: Buckling of Structures III

Chair: Prof. Y. Chen, Southeast University, China

13:30: On the stability behaviour of crane runway girders influenced by residual stresses of welded rails, C. Moscoso, A. Africano, M. Kraus

13:45: Formulae for calculating elastic buckling loads for web crippling of rectangular hollow sections, R. Dai, L. Gardner, M.A. Wadee

14:00: Insights on the buckling behaviour of space frames of D_{2h} symmetry: Group-theoretic formulation, C. Kaluba, A. Zingoni

14:15: On the flexural-torsional buckling of mid-span restrained beam-columns with a steel bisymmetric I-shape section, P. Wiedro, M.A. Gizejowski

14:30: Load-bearing capacity of steel curved plates: A numerical investigation, R. Mohammadesmaeili, A. Heidarpour

14:45: Insights on the buckling behaviour of space frames of D_{2h} symmetry: Effect of loading symmetry, C. Kaluba, A. Zingoni

A-T4: Shells & Plates

Chair: Prof. U. Galvanetto, University of Padua, Italy

15:30: High-pressure and long-duration blast load design for cylindrical steel tanks: A computational approach, J. Rosin, A. Stocchi

15:45: On the structural viability of hyperbolic shells of revolution for liquid containment: Stress analysis and buckling behaviour, H.A. Mahlelebe, A. Zingoni

16:00: Design strategies for catenary domes in affordable housing solutions, R. Bradley, A. Danda, K. Gcaba, M. Gohnert

16:15: Influence of concrete creep on performance of pre-stressed elliptical paraboloid shells, G. Sossou

16:30: Comparison of folded plate theory and FEA for the structural analysis of thin-walled floor slabs, M. Dombrowski, L. Braun, A. Prziwarzinski, M. Schlaich

16:45: Bending of plates made of non-simple viscoelastic porous materials, S. De Cicco

A-W2: Seismic Response; Seismic Design - I

Chair: Prof. A. Kappos, Khalifa University, UAE

10:30: Fragility assessment of existing low-rise steel moment-resisting frames with masonry infills under mainshock-aftershock earthquake sequences, L. Di Sarno, J. Wu (**Invited Paper**)

11:00: Seismic response analysis of steel piers using biaxial material tests and the three-surface model, R. Nishii, K. Sugiura, A. Sato, T. Yamamoto, T. Niina

11:15: Tuned inerter damper for seismic response reduction in elastoplastic buildings, A. Pandit, M. O'Shea

11:30: Detection and assessment of seismic response of high-speed railway bridges based on artificial intelligence and game engine, J.Q. Liu, W. Bo, X.F. Zhao

11:45: Numerical seismic analysis of a steel braced frame equipped with passive fire protections and firewalls, P. Covi, M.L. Tornaghi, N. Tondini

12:00: Numerical modelling of the southbound Stellenberg Interchange Bridge B5593 subjected to seismic excitation, W. Olivier, T.N. Haas

12:15: Assessment of the collapse drift capacity of slender flanged RC structural walls built with high-strength rebar, N. Samanta, K. Dasgupta, L. Di Sarno

A-W3: Seismic Response; Seismic Design - II

Chair: Prof. L. Di Sarno, University of Liverpool, UK

13:30: Comparison of design equivalent seismic load and the demand of February 2023 Kahramanmaraş Earthquake (Turkey) on RC buildings, A. Cengiz, T. Gurbuz

13:45: Comparing the seismic fragility curves of RC shear walls obtained using incremental dynamic analysis and performance based approaches, P.N. Mohan, A. Chatterjee

14:00: New preventive vision of the seismic risk, M. Acito, M. Buzzetti

14:15: Seismic evaluation of the southbound Stellenberg Interchange Bridge B5593, W. Olivier, T.N. Haas

14:30: Influence of high sustained axial stresses on the seismic behaviour of full-scale substandard reinforced concrete columns, S. Gundogan, U. Demir, O.T. Turan, A. Ilki

14:45: Seismic analysis of transmission lattice towers in South Africa, T. Haas, S. Msiwa, C. De Beer, D. Albertyn, T. Loots

A-W4: Spatial Structures; Shape Optimisation

Chair: Prof. S. Pellegrino, California Institute of Technology, USA

15:30: Shape optimization using the explicit Vertex Morphing method with filter kernels in mapped coordinates, D. Schmölz, B. Devresse, K.-U. Bletzinger, R. Wüchner, A. Geiser

15:45: Reconfigurable and temporary spatial structures: A paradigm of structural design based on CFD analyses, S. Gkatzogiannis, M.C. Phocas, E.G. Christoforou, D. Bouris

16:00: A node-based parameterization for bead-like features in shape optimization, B. Devresse, D. Schmölz, K.-U. Bletzinger, R. Wüchner, A. Geiser

STREAM B

B-M2: Steel Structures; Steel Connections - I

Chair: Prof. M. Gizejowski, Warsaw University of Technology, Poland

- 10:30:** Investigating the behaviour of angle cleat hybrid steel beam-column connections at elevated temperatures, C. Quan, L. Lapira, K.A. Cashell
10:45: Tests on screwed connections failing in tilting/bearing under shear, H.V. Le, C.H. Pham, P. Jones, T. Clayton, M. Eckermann
11:00: Experiments on steel-to-concrete corner-bolted end-plates under biaxial bending, M. Sonna Donko, M. Couchaux, J.-P. Boudot
11:15: Eurocode 2nd generation: Advances in fatigue design of steel structures, M. Rauch
11:30: Comparative stress analysis of longitudinally and transversely stiffened orthotropic steel deck bridges, S. Chowdhury, A. Sharma, M.N. Keebiyage, M. Kraus
11:45: Towards model updating of steel bridges using strain data, C. Flack, M. Oberwestberg, S. Pitters, P.L. Niebuhr, R. Wüchner
12:00: Closely spaced back-to-back double-angle columns: Influence of realistic end supports on compression member capacity, M. Kettler, P. Zauchner, H. Unterweger
12:15: Evaluation of corrosion condition of weathering steel using alternating current impedance method, S. Kido, H. Oba, M. Matsukawa, Y. Sugimoto, H. Onishi

B-M3: Steel Structures; Steel Connections - II

Chair: Prof. M. Al-Emrani, Chalmers University of Technology, Sweden

- 13:30:** Carbon fibre textile counteracting the distortion of thin-walled cold-formed steel sigma beams, K. Rzeszut, M.A. Dybizbański (**Invited Paper**)
14:00: Impact of perforation shapes on the web crippling failure mode in C-shaped cold-formed steel beams using ANSYS workbench, S. Sreejith, M.P. Kulatunga, M. Macdonald, K. Alizadehhesari
14:15: Characterizing the hysteretic response of extended endplate connections based on deformation mode classification, Z. Ding, A. Elkady
14:30: A data registration method for a self-developed scanning robot for structural members, X. Zhao, M. Zhang, M. Su, X. Wang
14:45: Moment capacity of cold-formed steel hat sections, W. Zhou, J.P. Papangelis

B-M4: Steel Structures; Steel Connections - III

Chair: Dr. J. Papangelis, University of Sydney, Australia

- 15:30:** Investigation on beam-column connection for novel composite columns with high-strength steel core, C. Schwendner, M. Mensinger, S. Ameri, J. Zehfuss
15:45: Fatigue strength of flange-to-web welded detail in corrugated web girders, M. Al-Emrani, F. Hlal
16:00: Real behaviour of selected rigid and semi-rigid steel connections, M. Rosmanit
16:15: Ductility of G20Mn5 cast steel and capacity safety factor for cast steel joints, S. Yan, C. Wang, X. Zhao
16:30: Load effects for fatigue design of web-to-flange welded detail in corrugated web girders, F. Hlal, M. Al-Emrani
16:45: A study of moment gradient factors for selected monosymmetric steel beams under linear moment gradients, K. Mudenda

17:00: Post-fire behaviour of 6082-T6 aluminium lap joints, M. Gkantou, M. Cabrera, M. Bock, M. Theofanous

B-T2: High Strength Steel; High Performance Steel

Contributions to Special Session SS18: High Strength Steel in Research, Construction and Application. Organisers: Prof. Richard Stroetmann, TU Dresden, Germany; Prof. Guo-Qiang Li & Prof. Yan-Bo Wang, Tongji University, China

Co-Chairs: Prof. R. Stroetmann, TU Dresden, Germany; Prof. G.Q. Li & Prof. Y.B. Wang, Tongji Univ., China

10:30: Challenges and new insights for the design and execution of welded joints on high-strength steels, R. Stroetmann, B. Rust, G. Penner (**Invited Paper**)

11:00: Experimental investigation on structural behavior of concrete-filled S690 steel tubes, S. Li, Y. Yang, J.Y.R. Liew, S.D. Pang, Z.X. Cong, Y.H. Ng

11:15: Steady-state temperature field analysis and softening-hardening region discussion for Q690 butt-welded joint, Z. Sun, Y.-B. Wang, G.-Q. Li, Q. Chen

11:30: Accuracy verification of high-strength bolt finite element models used to evaluate the performance of tensile joints, Y. Sugimoto, R. Kikuchi

11:45: Analysis of temperature field and hardness distribution of the heat-affected zone in high-strength steel fillet welds, Y. Gao, Z. Sun, Y.-B. Wang, G.-Q. Li, Y. Gao, R. Yan, X.L. Xhao

12:00: Temperature influence on hydrogen embrittlement of high-strength steel, A.H. Jabbari, Z. Silvayeh, P. Auer, J. Domitner

12:15: The load-bearing capacity of CFST columns with high-strength materials considering the triaxial mechanical properties of concrete, Y.-B. Wang, G.-Q. Li, C. Song, L.-J. Bao

B-T3: Stainless Steel Structures; Aluminium Structures

Contributions to Special Session SS03: Stainless Steel Connections under Static and Extreme Loading. Organisers: Prof. Leroy Gardner, Imperial College London, UK; Dr. Sheida Afshan, Univ. of Southampton, UK; Dr. Katherine Cashell, Univ. College London, UK; Dr. Marios Theofanous, Univ. of Birmingham, UK

Co-Chairs: Dr. M. Theofanous, Univ. of Birmingham, UK; Dr. J. Qureshi, Univ. of East London, UK

13:30: Material and hybrid connection behaviour of a new nickel-free stainless steel at elevated temperatures, R. Zhang, Z. Liang, C. Quan, L. Lapira, K.A. Cashell, L. Gardner

13:45: Ductility and energy dissipation of partially threaded and fully threaded A4-80 bolts under cyclic tension, M. Cabrera, M. Theofanous, M. Bock, H. Yuan, K. Skalomenos

14:00: Behaviour of stainless steel T-stubs under varying strain rates, W. Li, M. Ouyang, S. Afshan, M. Cabrera, M. Theofanous

14:15: Behaviour and design of stainless steel lap joints under high loading rates, M. Cabrera, M. Theofanous, R. Zhang, S. Dirar, L. Gardner

14:30: Fatigue behaviour of aluminium 6005A-T6 alloy after exposure to elevated temperatures, T. Molkens, B. Karabulut

14:45: Ultimate response of nickel-free stainless steel T-stubs subjected to high loading rates, M. Cabrera, M. Theofanous, W. Li, S. Afshan

B-T4: Steel-Concrete Composite Structures

Chair: Prof. O. Mirza, Western Sydney University, Australia

15:30: Numerical investigation of steel and concrete composite framed structures under a column loss scenario, N. Baldassino, G. Roverso, R. Zandonini

15:45: Numerical investigations on the partial shear connection theory in composite beams with transverse profiled steel sheeting at elevated temperatures, K. Tutzer, M. Stempl, M. Mensinger

16:00: Finite element modelling of shear stud behaviour in composite beams with parallel steel decking, J. Qureshi

16:15: Compressive resistance of short concrete-filled double-skin columns with outside steel and inside PVC circular tubes, Y. Essopjee, M. Dundu

16:30: Investigation of bond-slip behaviour in concrete-filled steel tubes, T. Dorbolò, G. Somma, N.C. Van Engelen

B-W2: Sustainable Construction; Reuse of Materials and Structures - I

Contributions to Special Session SS14: Reuse of Steel and Composite Structures. Organisers: Prof. Markus Knobloch, Anna-Lena Bours & Sara Uszball, Ruhr University Bochum, Germany

Chair: Prof. M. Knobloch, Ruhr University Bochum, Germany

10:30: On sustainability assessments for a viable reuse of structural components, S. Uszball, A.-L. Bours, M. Knobloch

10:45: Effect of increased imperfections on the buckling behaviour of reused steel members, B. Kövesdi, M. Radwan

11:00: Development and analysis of an innovative high-strength steel adaptable beam-to-column connection, A.S. de Carvalho, T. Bogdan, C. Odenbreit, J.F. Demonceau, R. Matos, R. Obiala

11:15: Re-use of structural steel components: Method for re-qualification in view of material properties, F. Eyben, H. Bartsch, M. Feldmann, B. Döbereiner, F. Bexter, P. Langenberg

11:30: An experimental test set-up to evaluate residual stresses and imperfections on historical riveted steel beams, T. Molkens, B. Kövesdi, P. Ryjáček

11:45: The Pavillion Petite Maison: A holistic view on the modular concept of the “Reuse Plug Play System” design for disassembly and reuse, T. Bogdan, S. Sayyareh, A.S. de Carvalho, C. Odenbreit, A. Kozma

12:00: Assessment of increased imperfections of tubular truss members due to service conditions, V. Szalai, A. Ciutina, A. Stratan, V. Ungureanu

12:15: Quantifying the impact of structural material choice and reuse on carbon emissions of flooring systems: Innovative concept and analysing tool, S. Sayyareh, T. Bogdan, C. Odenbreit, R.W.D. Siebers, T. Ummenhofer

B-W3: Sustainable Construction; Reuse of Materials and Structures - II

Chair: Prof. R. Rempling, Chalmers University of Technology, Sweden

13:30: Paper lime elements: Mechanical characteristics and load bearing behavior, S. Reich, C. Pfütze

13:45: Optimizing the carbon footprint of steel bridges using the principle of virtual work, J.H. Strydom, A. Elvin

14:00: Comparative analysis of concrete slab frame bridges and soil-steel composite bridges crossing pedestrian walkways: A cost and climate perspective, J. Lagerkvist, F. Carlsson, R. Rempling

14:15: Comparison in terms of CO₂ footprint between RC and CLT buildings, E. Runcio, G. Somma

14:30: Towards a structural condition assessment framework for selective reuse, E.M. Carson, J.E. van der Merwe, C.A. Davey

14:45: New material compositions for drywall elements, C. Pfütze, S. Reich

B-W4: Sustainable Construction; Reuse of Materials and Structures - III

Chair: Prof. S. Reich, Anhalt University of Applied Sciences, Germany

15:30: Optimizing cost and carbon emissions in the conceptual building design with genetic algorithms, L. Cusumano, R. Rempling, M. Granath, N. Olsson

15:45: Optimizing the carbon footprint including transportation emissions of steel structures, J.H. Strydom, A. Elvin

- 16:00:** Concrete infrastructure in the face of climate emergency: Sustainability, resilience and adaptation challenges, F. Pacheco-Torgal
- 16:15:** Application and challenges of biopolymers in sustainable construction: Through scientometric analysis and systematic review, B.B. Mitikie, W.A. Elsaigh
- 16:30:** Navigating carbon dioxide challenges: From emission reduction struggles to eco-efficient construction solutions, F. Pacheco-Torgal

STREAM C

C-M2: High Strength Concrete; High Performance Concrete; Fibre-Reinforced Concrete

Co-Chairs: Prof. K. Holschemacher, Leipzig University of Applied Sciences, Germany; Prof. J. Schröder, University Duisburg-Essen, Germany

- 10:30:** Challenges in the production of precast carbon-reinforced concrete elements, K. Holschemacher (**Invited Paper**)
- 11:00:** A material model for the analysis of UHPFRC components under tensile loading based on a mixed stress-strain formulation, L. Gietz, U. Kowalsky, D. Dinkler
- 11:15:** Internal curing of high-performance concrete using demolition construction waste, V. Bílek, L. Prochazka, R. Čajka, M. Krejsa
- 11:30:** Optimised fibre reinforced polymer bridge design using variable angle tow composites, A. Madeo, F.S. Liguori, G. Zucco
- 11:45:** Phase-field modelling for failure behaviour of reinforced ultra-high performance concrete under creep load, M.A. Margalho de Barros, M. Pise, D. Brands, J. Schröder
- 12:00:** Improvement in the aging resistance of uncoated AR-glass textile reinforcement, F. Kufner, M. Horstmann, P. Rucker-Gramm
- 12:15:** Experimental investigation of fibre reinforced engineered cementitious composite short deep beam under static and impact loading, F.Z. Gigar, Z.Y. Kuang, H. Wang, A. Khennane, N.A. Workeluel, B.H. Tekle, Z. Li
- 12:30:** Crack formation behaviour of carbon-reinforced concrete for state II sealing layers, F. Kufner, M. Horstmann, P. Rucker-Gramm, J. Reymendt, J. Heckenbach, R. Scharmann

C-M3: Reinforced Concrete; Prestressed Concrete - I

Contributions to Special Session SS05: Mechanics of Reinforced Concrete and Construction Materials.
Organiser: Prof. Maria Anna Polak, University of Waterloo, Canada

Chair: Prof. M.A. Polak, University of Waterloo, Canada

- 13:30:** Interface bonding in 3D-printed concrete: Experimental evaluation and numerical modeling, Z. Miri, R.M. Aurilio, M.A. Polak, H. Baaj (**Invited Paper**)
- 14:00:** Investigating the strength enhancement of concrete elements with adverse geometries using permanent plastic formwork, Q. Reduan, C. Buchanan, A. Kia
- 14:15:** Reinforced concrete T-beams: Cracking related to environmental loading and restraint, A. Kleynhans, E.P. Kearsley, S.A. Skorpén
- 14:30:** Meta model predictions of restraint forces in RC slab structures: Model development and comparison to real scale experiments, C. Walsemann, T. Schmidt, A. Albert
- 14:45:** Effect of confinement on the performance of GFRP reinforced concrete corner joints under opening loads, S. Saad, L. Bashbishi, M.A. Polak

C-M4: Reinforced Concrete; Prestressed Concrete - II

Co-Chairs: Prof. E.Y. Sayed-Ahmed, American University in Cairo, Egypt; Prof. K. Holschemacher, Leipzig University of Applied Sciences, Germany

15:30: Structural performance of the first precast and reinforced permeable concrete pavement, M. El-Zeadani, C. Buchanan, A. Kia

15:45: Experimental analysis of concrete beams retrofitted using carbon fibre reinforced polymer plates, T.M. Sibiya, J. Mahachi

16:00: Friction losses of post-tensioned beam: An experimental investigation, M. Serry, M. Darwish, Y. Sharkas, E.Y. Sayed-Ahmed

16:15: The bonding of mild steel plates to rib and block slabs for vertical shear enhancement, A. Akhalwaya, Y. Essopjee

16:30: Experimental study on flexural behaviour of fly-ash-based geopolymer reinforced concrete small beams, J. Chamberlain, S. Ekelu, B. Fraser, A. Wasserman, F. Solomon, A. Naghizadeh

C-T2: Structural Applications of FRP Composites - I

Contributions to Special Session SS08: FRP Composites in Civil Engineering Structures. Organisers: Prof. John Myers, Missouri University of Science and Technology, USA; Prof. Lawrence Bank, Georgia Institute of Technology, USA; Prof. Brahim Benmokrane, University of Sherbrooke, Canada

Chair: Prof. J. Myers, Missouri University of Science and Technology, USA

10:30: 25 years of FRP research at Istanbul Technical University, A. Ilki, B. Sari, C. Goksu, C. Demir, U. Demir, E. Tore (**Invited Paper**)

11:00: Testing and analysis of pedestrian bridge made of discarded wind turbine blades, K. Ruane, V. Jaksic, L.C. Bank, T.R. Gentry, K. McDonald, M. Soutsos, C. Graham, E. Delaney, J. McKinley, P. Leahy, A. Nagle, E. Esmaeeli, V. Pakrashi (**Invited Paper**)

11:30: Flexural performance of concrete beams reinforced with GFRP, BFRP or hybrid reinforcement, Y. Elbawab, Y. Elbawab, Z. El Zoghby, O. Elkadi, M. AbouZeid, E. Sayed-Ahmed

11:45: Corrosion characteristics of CFRP bonded steel plate in seawater through salt water immersion test, C. Fukunaga, Y. Kitane, R. Matsumoto, Y. Miyagawa, K. Fujita, K. Shimozawa, K. Sugiura, T. Matsui

12:00: Investigation of the shear-slip relationship in UHPC reinforced with CFRP composites by push off tests, D. Sheferaw, M.F. Green

12:15: Investigation of mechanical properties of high-density polyethylene/carbon nanofibres nanocomposites produced by extrusion method, S.D. Jobe, H.M. Ngwangwa, R.T. Tebeta, D.M. Madyira, J. Letwaba, L. Maubane

C-T3: Structural Applications of FRP Composites - II

Contributions to Special Session SS08: FRP Composites in Civil Engineering Structures. Organisers: Prof. John Myers, Missouri University of Science and Technology, USA; Prof. Lawrence Bank, Georgia Institute of Technology, USA; Prof. Brahim Benmokrane, University of Sherbrooke, Canada

Chair: Prof. J. Myers, Missouri University of Science and Technology, USA

13:30: Mitigation and repair strategies using FRCM to extend the service life of reinforced and prestressed concrete structures, J.J. Myers (**Invited Paper**)

14:00: Evaluation of the effectiveness of FRP composites in the seismic resilience of limited ductility columns using hybrid testing techniques, R. Al-Mahaidi, J. Hashemi, R. Kalfat (**Invited Paper**)

14:30: Impact load performance of UHPC beams with central openings: Experimental and numerical study, S.G. Angural, T.G. Aditya, S.K.S. Pachalla

14:45: Interface shear transfer behavior of basalt fiber-reinforced polymer (BFRP) in reinforced concrete using the push-off test, J.J. Myers, L. Coulter

C-T4: Structural Applications of FRP Composites - III

Contributions to Special Session SS08: FRP Composites in Civil Engineering Structures. Organisers: Prof. John Myers, Missouri University of Science and Technology, USA; Prof. Lawrence Bank, Georgia Institute of Technology, USA; Prof. Brahim Benmokrane, University of Sherbrooke, Canada

Co-Chairs: Prof. R. Al-Mahaidi, Swinburne University of Technology, Australia; Prof. A. Ilki, Istanbul Technical University, Turkey

15:30: Recent developments in the use of GFRP reinforcing bars in concrete construction and advance-ments in design codes and standards, B. Benmokrane, S.A. Hosseini, K. Mohamed **(Invited Paper)**

16:00: Development of fly ash geopolymers incorporating Andalusite powder to enhance thermomechanical performance under elevated temperatures for NSM CFRP strengthening application, H. Shdeifat, R. Kalfat, R. Al-Mahaidi

16:15: Numerical simulation of the time-dependent and rate-dependent behavior in CFRP-concrete interfaces, Y. Wang, J. Vorel, A. Cibelli, J. Belis, R. Wan-Wendner

16:30: Explainable machine learning prediction of the flexural capacity of UHPFRC beams, K. Silewu, C. Kahanji, L. Simwanda

16:45: Experimental investigation and methodology for enhancing flexural strength of reinforced concrete beams using NSM GFRP, B. Arab, E.Y. Sayed-Ahmed

C-W2: Timber Structures; Timber Technology

Contributions to Special Session SS19: Challenges and Opportunities for Modern Timber Engineering in a Changing World. Organisers: Prof. Robert Jockwer, Technical University of Dresden, Germany; Dr. Johann van der Merwe, University of Pretoria, South Africa

Co-Chairs: Prof. R. Jockwer, Technical University of Dresden, Germany; Dr. J. van der Merwe, University of Pretoria, South Africa

10:30: Derivation of material parameters for various hardwood species for use in the design approaches of Eurocode 5 for timber structures, R. Jockwer

10:45: Performance of CLT-concrete composite slabs made with South African timber, D.L. Teixeira, J.E. van der Merwe, C.P. Roth

11:00: CLT-steel composite flooring: A sustainable solution for South Africa?, S.A. Skorpen, G. Cattaert, A. Bouchair

11:15: The distribution of mechanical properties of South African Eucalyptus timber, O. de Lange, C.P. Roth, J.E. van der Merwe

11:30: Design for structural adaptation with demountable cross-laminated timber connections, V. Öberg, Y. Goto, R. Jockwer, Z. Li

11:45: The shear performance of South African Pine and Eucalyptus CLT, B.E. Boulle, J.E. van der Merwe, C.P. Roth

12:00: A comparison of test methods for bending stiffness and strength of South African plywood, T. Yang, C.P. Roth, J.E. van der Merwe

12:15: Evaluating models for doweled connection capacity in South African timber, L.M. Mahole, J.E. van der Merwe, C.P. Roth

C-W3: Mechanics of Wood; Construction Materials I

Incorporating contributions to Special Session SS21: Fracture and Thermo-Hydromechanical Behaviour of Wood and Timber Structures. Organiser: Dr. Rostand Moutou Pitti, Université Clermont Auvergne, France

Chair: Dr. R. Moutou Pitti, Université Clermont Auvergne, France

13:30: Enhancing the durability of green wood in civil engineering: 3D crack monitoring using image correlation, X-ray micro-tomography and machine learning, S.E. Hamdi, S. Ekomy Ango, C.F. Pambou Nziengui, R. Moutou Pitti, J. Gril, E. Badel, E. Toussaint

13:45: Assessing the impact of crack propagation in wood mechanical behaviour: Analytical and numerical models, C.F. Pambou Nziengui, S.E. Hamdi, C. Jaafari, R. Moutou Pitti

14:00: Fracture toughness investigation of three tropical species from Cameroun using LSA method, R. Biyo'o, A.B. Biwole, E. Yamb, B. Blaysat, T. Jailin, N. Sauvat, J. Gril, R. Moutou Pitti

14:15: Experimental study of the mechanical behavior of *Irandia* (*Albizia ferruginea*) from Cameroon using the non-destructive testing and evaluation method, E. Nouemsi Soubgui, F.D. Nkontchiachou Nkana, S.B. Keumeka Jiofack, G. Mabou Ninkam, T.V. Ngo Kaljob, C.F. Pambou Nziengui, N. Sauvat, R. Moutou Pitti, J. Gril

14:30: Geopolymer concrete for structural engineering applications: A review, F. Solomon, S. Ekolu, A. Naghizadeh

14:45: Optimising the properties of fired clay bricks produced in the far west of DR Congo, B. Lewo Nkondi, B. Blaysat, N. Azama, R. Moutou Pitti

C-W4: Cement-Based Materials; Construction Materials II

Co-Chairs: Prof. M.F. Green, Queen's University, Canada; Prof. R. Cajka, VSB - Technical University of Ostrava, Czech Republic

15:30: Comparison of the time evolution of temperatures in massive foundation structures due to the hydration of concrete made from alkali-activated materials and from cement, R. Cajka, K. Burkovic, V. Bilek, P. Mec, M. Krejsa

15:45: Investigation on mechanical properties of geopolymer matrix composites using alkaline activator powder, R. Horikawa, L. An, K. Sugiura, H. Shinohara

16:00: Recent advances on self-healing in cement-based materials through the addition of cementitious macro-capsules, G. Anglani, J.-M. Tulliani, P. Antonaci

16:15: Statistical evaluation of PET-fibre reinforced laterized concrete with waste ceramic as a replacement for cement, S.A. Alabi, J. Mahachi

16:30: A comparative study of the asphalt mix master curve generation using various temperature shifting techniques and reference temperature, M. Belhaj, J. Valentin

STREAM D

D-M2: Railway Tracks; Foundations; Tunnelling

Co-Chairs: Prof. R. Katzenbach, TU Darmstadt, Germany; Prof. X. Zhao, Dalian Univ. of Technology, China

10:30: Influence of train travel direction on bridge-embankment transition zones in high-speed railway ballasted tracks, A. Ahmadi, S. Larsson

10:45: Finite element modelling of dynamically loaded ballasted railway tracks on saturated clayey soils, C. Moormann, F. Mitlmeier, S. Freudenstein, N. Lilin

11:00: Using the digital twin model train the blasthole recognition algorithm, Y. Feng, X. Zhao, J. Luo, R. Ren, Y. Yang

11:15: Tunnel surrounding rock deformation monitoring system based on binocular vision and deep learning, B. Bai, X. Zhao, J. Luo, R. Ren, C. Li, Y. Dong

11:30: Verification of the stress conditions of shotcrete shells in tunnel construction, D. Zapf, F. Körner, M. Achmus, S. Sefene

11:45: Research on tunnel blasthole image recognition method based on light-weighting improved YOLOV7, Y. Feng, X. Zhao, J. Luo, R. Ren, Y. Li

12:00: Research on multi-point displacement sensor based on machine vision, Z. Cheng, B. Bai, J. Liu, X. Zhao

D-M3: Soil-Structure Interaction; Foundations; Geotechnical Engineering - I

Co-Chairs: Prof. M. Achmus, Leibniz University of Hannover, Germany; Prof. C. Moormann, University of Stuttgart, Germany

13:30: Top-down-construction method with a diaphragm wall used as permanent external wall, M. Seip, S. Fischer, R. Katzenbach

13:45: A settlement model in a FEM framework for geotechnical engineering applications, R. van der Meij, W. Ausmann, J.A.M. Teunissen

14:00: Optimization of bridge foundations using the combined pile-raft foundation, S. Leppla, J.C. Paninski, M. Scholz

14:15: Numerical analysis of the vibration isolation effects of infilled trench barrier in unsaturated poroviscoelastic ground, S. Li

14:30: Impact of sand pre-shearing in direct simple shear tests on the prediction of capacity degradation of axially loaded piles, D. Hansmann, M.S. Trüe, M. Achmus

14:45: Soil mechanical design of different temporary anchor systems, S. Leppla, J.C. Paninski

D-M4: Additive Manufacturing; 3D Printing

Incorporating contributions to Special Session SS07: Advanced Technologies for Reducing the Carbon Footprint of Steel Structures. Organisers: Dr. Vittoria Laghi, University of Bologna, Italy; Alper Kanyilmaz, Politecnico of Milan, Italy; Josephine Carstensen, MIT, USA

Co-Chairs: Dr. V. Laghi, University of Bologna, Italy; Prof. J. Vorel, Czech Technical University in Prague, Czech Republic

15:30: Steel additive construction: New possibilities for efficient structural systems, V. Laghi, G. Gasparini

15:45: Reinforcing thin sheet metal in various geometries and directions with Wire Arc Additive Manufacturing (WAAM), P. Grebner, J. Lange, F. Rädcl

16:00: Utilization of lattice discrete particle model for modelling of 3D-printed alloys, J. Vorel, A. Jíra, J. Kruis

16:15: Analysis of the impact of steel 3D printing in construction, V. Laghi, E. Savino, G. Gasparini

16:30: Compression behaviour of alumina ceramic for bio-inspired 3D-printed dental implants, E. Munenge, W. Mtetwa, H.M. Ngwangwa, T. Pandelani, L. Lebea

D-T2: Soil-Structure Interaction; Foundations; Geotechnical Engineering - II

Contributions to Special Session SS09: Renewable Energy Structures. Organisers: Prof. Lars Andersen, Aarhus University, Denmark; Dr. Zili Zhang, Tongji University, China

Chair: Prof. L.V. Andersen, Aarhus University, Denmark

10:30: Modelling of monopile-based offshore wind turbines: Comparison of soil–structure interaction models accounting for hysteretic soil behaviour, L.V. Andersen, M.D. Christophersen, W.H. Nguyen, M.K. Hoffmann, M. Damgaard (**Invited Paper**)

11:00: Recent developments regarding the design of monopiles supporting offshore wind energy converters, M. Achmus (**Invited Paper**)

11:30: A coupled FEM-SBM methodology for structure-soil-structure dynamic interaction problems, H. Liravi, J. Ninić, A.A. Shiraz, A. Clot

11:45: Application of Convected Particle Domain Interpolation Method (CPDI) for predicting dynamic installation processes of offshore monopiles by vibration and impact driving, C. Moormann, S. Giridharan, D. Stolle

12:00: Soil interaction modelling of large diameter offshore wind monopiles, L. Kellezi, K.A. Abhinav

12:15: Model testing of a cyclically loaded gravity foundation on saturated sand under partially drained conditions, N. Goldau, M. Achmus

12:30: A hierarchical Bayesian approach to the geotechnical site assessment for offshore wind farms, L.V. Andersen, U. Alibrandi, M. Geessink, A.B. Mikkelsen

D-T3: Damage Modelling; Fracture & Fatigue I

Chair: Prof. T. Ricken, University of Stuttgart, Germany

13:30: Numerical modelling of complex fracture patterns: From crack branching at dynamic loading to fragmentation of tempered glass, A. Kanan, M. Kaliske (**Invited Paper**)

14:00: Numerical modelling of the fracture toughness of structural steel, S. Lochte-Holtgreven, J.-W. Jungen

14:15: A composite model for evaluating fatigue life of offshore wind turbines equipped with a tuned mass damper, J. McAuliffe, B. Broderick, B. Fitzgerald

14:30: Thermo-oxidative degradation of carbon fiber reinforced epoxy resin: Microstructural effects, V. Lovis, P. Wriggers

14:45: Geometrical effects on the longitudinal attachments' fatigue resistance, G.M.K. Hofmann, M. Knobloch, U. Kuhlmann

D-T4: Fracture & Fatigue II; Blast & Impact

Chair: Prof. M. Krejsa, VSB - Technical University of Ostrava, Czech Republic

15:30: Instrumented Charpy impact test as a tool for verifying the post-fire susceptibility of structural steel to brittle fracture, M. Maslak, M. Pazdanowski, M. Stankiewicz, P. Zajdel

15:45: Investigating the effect of pipe material stiffness on water leakage behaviour through longitudinal cracks in pressurized pipes: An experimental and numerical analysis, D.T. Ilunga, M.O. Dinka, D.M. Madyira

16:00: Study on bending fatigue strength of adhesively bonded joints considering stress ratio, V. Thay, Y. Osada, Y. Kanazawa, S. Fujikura, H. Nakamura, H. Horii

16:15: Application of DOProC method for stochastic prediction of fatigue damage of steel structures and bridges, M. Krejsa, R. Cajka, V. Bilek

16:30: Evaluating the performance and accuracy of blast gauge systems compared to pencil gauges in blast environments: A comparative study, T. Pandelani, S. Hamilton, D Modungwa, J.D. Reinecke

D-W2: Computational Mechanics; Material Modelling; Numerical Simulations

Incorporating contributions to Special Session SS04: Multiscale Models of Multiphase Porous Materials. Organisers: Prof. Tim Ricken, University of Stuttgart, Germany; Prof. Jörg Schröder, University of Duisburg-Essen, Germany

Co-Chairs: Prof. T. Ricken, University of Stuttgart, Germany; Prof. J. Schröder, University of Duisburg-Essen, Germany

10:30: Recent advances in peridynamics applied to structural problems, U. Galvanetto, V. Diana, P. Pavan, F. Scabbia, M. Zaccariotto (**Invited Paper**)

11:00: Modelling ice material properties and behavior for space engineering applications using molecular dynamics, A.P. Ricketts, L.S. Morrissey, R.S. Taylor

11:15: Towards multi-fidelity models of coupled multi-X processes in sea ice within the Antarctic marginal ice zone, R. Pathak, A. Gupte, S.M. Seyedpour, B. Kutschan, S. Thoms, T. Ricken

11:30: Stress-driven integral elasticity for nanobeams based on higher-order shear deformation theories, R. Barretta, F. Marotti de Sciarra, F.P. Pinnola, M.S. Vaccaro, D. Ussorio

11:45: Mathematical modeling and numerical simulation of atherosclerosis, M. Soleimani, P. Wriggers, P. Junker, C. Gasser, A. Haverich

12:00: GReS: A novel multi-physics multi-domain computational tool for geomechanical subsurface simulations, M. Ferronato, A. Franceschini, D. Moretto

12:15: Towards small-strain viscoelastic modeling of sea ice at the calving front within the Material Point Method, M. Kossler, J. Schröder

D-W3: Numerical Modelling; Biological Tissue I; Biomedical Engineering I

Incorporates contributions to Special Session SS23: Mechanical Characterization of Soft Tissues. Organisers: Prof. Thanyani Pandelani & Prof. Harry Ngwangwa, UNISA, South Africa; Prof. Fulufhelo Nemavhola, Durban Univ. of Technology, South Africa; Dr. Dithoto Modungwa, Council for Scientific and Industrial Research, South Africa; Prof. Dawood Desai, Tshwane Univ. of Technology, South Africa

Co-Chairs: Prof. T. Pandelani & Prof. H. Ngwangwa, UNISA, South Africa

13:30: Finite element modelling of 2.5D meta-structures with varying Poisson's ratios, N.A. Workeluel, D. Judge, H.B. Dura, F.Z. Gigar, A. Khennane, Z. Li

13:45: The thermal effect on transonic flow for various aerodynamic shapes: An analysis of heating and cooling impacts, G. Mbau, A. Netshivhulana, M. Adeoba, H. Ngwangwa, T. Pandelani

14:00: Simulating pelvic injuries from underbody blasts: A 2D finite element model analysis, T. Pandelani, D. Carpanen, S.D. Masouros

14:15: Investigations of hyperelastic constitute models of healthy and cancerous breast cells at various strain rates, L. Lebea, H. Ngwangwa, F. Nemavhola, D. Desai, D. Modungwa, T. Pandelani

14:30: Topography optimisation and experimental validation of an external circular fixator, W. Barros, H.M. Ngwangwa, T.A. Pandelani, F.J. Nemavhola, D. Desai, D. Modungwa

14:45: Environmental impact of organic materials and structures in biomedical applications: A critical review, M.I. Adeoba, T. Pandelani, H. Ngwangwa, T. Masebe

D-W4: Biological Tissue II; Biomedical Engineering II

Contributions to Special Session SS23: Mechanical Characterization of Soft Tissues. Organisers: Prof. Thanyani Pandelani & Prof. Harry Ngwangwa, UNISA, South Africa; Prof. Fulufhelo Nemavhola, Durban Univ. of Technology, South Africa; Dr. Dithoto Modungwa, Council for Scientific and Industrial Research, South Africa; Prof. Dawood Desai, Tshwane Univ. of Technology, South Africa

Co-Chairs: Prof. T. Pandelani & Prof. H. Ngwangwa, UNISA, South Africa

15:30: Measurement of planar stresses in porcine Achilles tendons using the VIC-EDU digital image correlation system, H.M. Ngwangwa, T.A. Pandelani, F. Nemavhola, D. Modungwa, T. Masebe

15:45: The effect of residual stress and surface roughness on mechanical behaviour of hybrid surface implants using finite element analysis, L. Lebea, D.A. Desai, H.M. Ngwangwa, F. Nemavhola

16:00: Viscoelastic modelling of right ventricular and septum myocardia of porcine heart, L. Semakane, I. Mabuda, H. Ngwangwa, T. Pandelani, F. Nemavhola

16:15: Characterization properties of bio-adhesive material from candelabra tree, A. Madiba, H.M. Ngwangwa, T.R. Tebeta, D.M. Madyira

16:30: An investigation into the effect of an acid concentration on the corrosion of alumina dental implants, W. Mtetwa, E. Munenge, L. Lebea, H.M. Ngwangwa, T. Pandelani

STREAM E

E-M2: Wind Power Plants; Wind Load; Safety, Risk & Vulnerability; Machine Learning

Chair: Prof. J.V. Retief, University of Stellenbosch, South Africa

10:30: Wind power plants: Possibilities, challenges and limits, H. Pasternak, K. Pasternak
(Invited Paper)

11:00: Wind load under anthropogenic climate change in South Africa, A.C. Kruger, J.V. Retief, M. Holický

11:15: Fragility of structures due to extreme actions, M. Holický, J.V. Retief

11:30: Wind analysis of transmission lattice towers in South Africa, T. Haas, D. Albertyn, D. Louw

11:45: Parametric modelling framework for assessing urban structure vulnerability to natural disasters, J. Rosin, S. Neuhäuser, J.Z. Vetter, A. Stolz

12:00: Analysis of current risk factors in construction projects: A legal approach, U. Quapp, J. Tamošaitienė, K. Holschemacher

12:15: Machine learning approaches for buildable and sustainable bridges, A. Kjellgren, R. Rempling, M. Granath, M. Johansson, H. Broo, P. Kettil

E-M3: Structural Optimization; Structural Reliability; Machine Design

Co-Chairs: Prof. C. Featherston, University of Cardiff, UK; Dr. L. Lomazzi, Politecnico di Milano, Italy

13:30: Parametric physics-informed neural networks as generalized structural surrogates for the optimization of reinforced concrete structures, T.M. Buschke, S. Gagesch, R. Wüchner

13:45: DeepF-fNet: A framework for vibration-based structural optimization, A. Tollardo, F. Cadini, M. Giglio, L. Lomazzi

14:00: Topology optimization for stiffened panels considering postbuckling, S. Chu, C.A. Featherston, D. Kennedy, H.A. Kim

14:15: Design constraints for segmented and prestressed bridge crane girders, J. Oellerich, M. Padhy, K.J. Büscher, M. Golder

14:30: Design and structural analysis of perforated gear systems in automotive transmissions, A.O. Nurudeen, S. Sreejith

14:45: Support vector machines in reliability calculations of engineering structures, M. Šomodíková, D. Lehký

E-M4: Digital Twinning; Building Performance; Housing

Co-Chairs: Prof. D. Wagg, University of Sheffield, UK; Dr. N. Evbuomwan, Accenture Inc., USA

15:30: Digital twinning in structural engineering applications, X. Shen, D.J. Wagg

15:45: Digital twin applications for rail infrastructure resilience, sustainability, and maintenance, N. Evbuomwan

16:00: Performance of reinforced concrete residential building under fire using OpenSees, M.B. Waris, M.B. Sulaiman, K. Al-Jabri, A. Al-Nuaimi

16:15: Autonomous night cooling system: Concept and prototype, S. Vanapalli, S. Reich

16:30: Convergence of frameworks on innovative housing design and construction, M.S. Monamodi Mlasi, J. Mahachi

16:45: Enhancing fraud prevention, title deed management, and housing development in human settlements through blockchain technology, F. Chikwira, J. Mahachi

E-T2: Structural Health Monitoring; Damage Detection; Structural Identification - I

Incorporating contributions to Special Session SS12: Modern Technologies for Infrastructure Inspection and Maintenance. Organisers: Prof. Chul-Woo Kim, Prof. Kunitomo Sugiura & Prof. Yasuo Kitane, Kyoto Univ., Japan; Prof. Takeshi Kitahara, Kanto Gakuin Univ., Japan; Prof. Shozo Nakamura, Nagasaki Univ., Japan.

Co-Chairs: Prof. C.W. Kim & Prof. K. Sugiura, Kyoto University, Japan

10:30: Remote bridge monitoring utilizing satellite observation digital twin, T. Miyamoto, K. Kinoshita, T. Kumura, F. Ogushi, P.J. Chun, R. Honda

10:45: Structural health monitoring of existing structures and infrastructures combining satellite interferometric data and on-site acquisitions, F.C. Ponzo, G. Tancredi, R. Ditommaso

11:00: Bridge damage detection using maximum displacement ratio, A. Hiro, C.-W. Kim

11:15: Investigation of regression models based on deep transfer learning for the effect of bridge temperature on the inclination of a prestressed concrete bridge, E.K. Ramasetti, R. Herrmann, S. Degener, M. Baeßler

11:30: A real-time strain monitoring sensor based on industrial cameras and machine vision technology, Z. Wen, W. Li, J. Luo, R. Ren, T. Xiong, B. Bai, X. Zhao

11:45: Identifying structural damage using a convolutional neural network from time-domain dynamic response data, B. Šplíchal, D. Lehký

12:00: Efficient detailed survey of cable-stayed bridge cables by combining inspection robot and eddy current testing equipment, S. Kakehashi, T. Yamaguchi, I. Hashimoto, S. Nakamura

12:15: Adjoint-based system identification for model validation and qualification, T.S.A. Ansari, S. Warnakulasuriya, R. Wüchner, K.-U. Bletzinger, I. Antonau, R. Löhner, H. Antil, F. Airaud

12:30: Early warning and smart technologies for structural health monitoring and seismic NaTech risk management in major hazard industries, A. Marino, M. Ciucci

E-T3: Structural Health Monitoring; Damage Detection; Structural Identification - II

Incorporating contributions to Special Session SS02: Structural Health Monitoring and Damage Identification. Organisers: Prof. Maria Pina Limongelli, Politecnico di Milano, Italy; Prof. Guido De Roeck, University of Leuven, Belgium

Co-Chairs: Prof. F. Ponzo, Univ. of Basilicata, Italy; Prof. G. De Roeck, Univ. of Leuven, Belgium

13:30: Substantial progress in vibration-based monitoring (VBM) by the application of strain mode shapes, G. De Roeck, D. Anastasopoulos, E. Reynders **(Invited Paper)**

14:00: Crack location by means of the use of roving loads, S. Caddemi, I. Calì, F. Cannizzaro, I. Fiore

14:15: Uncertainties in the dynamic identification process of existing buildings, M. Buzzetti, M. Acito, C. Chesi

14:30: Road condition monitoring and identification using low-cost alternative: Pretoria inner city roads as a case study, T. Babawarun, H. Ngwangwa

14:45: Infrastructure inspection methodologies to define correct maintenance activities: A two-level road parking structure case study in Italy, M. Pasetto, G. Giacomello, A. Baliello

15:00: Variational autoencoder with reinforcement learning for arch dam anomaly detection, T. Tshireletso, P. Moyo

E-T4: Glass Structures

Contributions to Special Session SS15: Structural Applications of Glass. Organiser: Dr. Faidra Oikonomopoulou, Technical University of Delft, The Netherlands

Chair: Dr. F. Oikonomopoulou, Technical University of Delft, The Netherlands

15:30: Reinforced cast glass: Embedded metal reinforcement for resilient and circular structural cast glass components, F. Oikonomopoulou, M. Ioannidis, T. Bristogianni

15:45: Equibiaxial bulge tests on silicone for use as structural sealant glazing, T. Reisewitz, M. Hajduk, G. Siebert

16:00: Deserts turned to glass: The research behind the Mirage Sculpture, T. Bristogianni, M. Ioannidis, F. Oikonomopoulou

16:15: Triggering bulk flaws in glass: Uniaxial tensile testing of glass using theta specimens, W. Damen, M. Overend, T. Bristogianni, F. Oikonomopoulou

E-W2: Structural Assessment; Rehabilitation

Chair: Prof. S. Nakamura, Nagasaki University, Japan

10:30: An innovative passive approach for a sustainable rehabilitation of existing constructions, G.A. Ferro, D. Falliano, L. Restuccia **(Invited Paper)**

11:00: Assessment and structural design of post-installed rebar (PIR) connections under fire conditions, K. Nincevic, T. Swart **(Invited Presentation)**

11:30: Warzone bridges: Inspection of bridges damaged or destroyed by explosions, Z. Fulka, J. Valentin

11:45: The use of digital image correlation in the structural performance assessment of railway bridges, A.W. Bezuidenhout, M. Jogiati

12:00: Seismic vulnerability assessment of RC bridge piers strengthened with GFRP rebars: A case study, R. Tarantini, M. Mairone, M. Givonetti, G. Gallina, G.A. Ferro, D. Masera, M. Corrado

12:15: The effect of CO₂ loading on corrosion of steel bars within concrete containing industrial waste products, P. van Tonder, S.Y. Patel

E-W3: Historic Structures; Masonry Structures

Chair: Prof. S. Caddemi, University of Catania, Italy

13:30: Seismic behaviour of masonry cross vaults in Medieval churches, M. Zizi, C. Chisari, M. Della Pietra, G. Iovinelli, G. De Matteis

13:45: Structural modifications to historic party walls, A. Mammen, J. Halpern

14:00: Prediction of masonry strength and earthquake resistance of historic buildings in Vienna using machine-learning algorithm, K. Deix, B. Rusnov

14:15: Structural behaviour of wood-geopolymer cement masonry prisms, F.Z. Gigar, A. Khennane, J.-L. Liow, Z. Li, B.H. Tekle

14:30: Protection and valorization of historical masonry heritage: Case studies from Southern Italy, G. De Matteis, M. Zizi, E. Spacone

E-W4: Bridge Analysis, Design & Construction

Chair: Mr. N. Featherston, Ovum Corporation, South Africa

15:30: A tale of two integral bridges, S. Skorpen, J. Adendorff, E. Kearsley, J. Harripershad, P. Fenton

15:45: Numerical simulation of full scale load tests on 50-year-old PC bridge deck beams under different loading and damage conditions, M. Anghileri, F. Biondini

16:00: Design of the Dhaka Elevated Expressway Project (DEEP), N.R. Featherston

16:15: Design and construction of the structural holding measures at Carinus Bridge (B2918) over the Berg River at Velddrif (South Africa), H. Aucamp, P.D. Ronné

16:30: Analysis and load testing of a 452.9m long footbridge over the Vistula River in Poland, M. Miśkiewicz, B. Sobczyk, K. Makowska-Jarosik, P. Tysiąc, B. Meronk, J. Kałuża

16:45: Permanent bearing design for an incrementally launched bridge with large seismic loads, N.R. Featherston

END