SZÉCHENYI EGYETEM
UNIVERSITY OF GYŐR

MSAM
Material Strength and Applied Mechanics

MSAM 2024

CONFERENCE PROGRAM

7TH INTERNATIONAL CONFERENCE ON MATERIAL STRENGTH AND APPLIED MECHANICS

JULY 29 - AUGUST 1, 2024 **GYŐR, HUNGARY**

Table of Content

Part I Conference Schedule Summary

Monday, July 29, 2024	**Lobby of the Management Campus** *– Széchenyi István University (SZE)*
14:00-20:00	Registration

Note for registration:

* Please show us your name or paper ID for registration.
* Please pick up all the conference materials at the registration desk (Name Card, Conference Program, Meal Tickets and Tour Ticket etc.).

Tuesday, July 30, 2024	**Conference Room: MC001-MC002 (Ground Floor)** *- Management Campus of SZE*
Chairman: ***Prof. Dr. Majid Movahedi Rad,*** *Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*	
09:00-09:10	**WELCOME SPEECH** ***Dr. Eszter Lukács, Vice President,*** *Széchenyi István University, Hungary*
09:10-09:25	**GROUP PHOTO**
09:25-10:05	**Keynote Speech 1: Materials Science-Based Guidelines to Develop Robust Hard Thin Film Materials** ***Prof. Paul H. Mayrhofer,*** *Institute of Materials Science and Technology, TU Wien, Austria*
10:05-10:45	**Keynote Speech 2: Carbon-Reinforced Concrete – An Innovative Material for Structural Applications** ***Prof. Dr. -Ing. Klaus Holschemacher,*** *Structural Concrete Institute (IfB), Leipzig University of Applied Sciences (HTWK Leipzig), Germany*
10:45-11:00	**COFFEE BREAK** ***- Lobby of the Management Campus***
11:00-11:40	**Keynote Speech 3: The Importance of Including Constructability Criteria and Sustainability Aspects within the Optimal Design Process** ***Prof. Giuseppe Carlo Marano****, Department of Structural, Geotechnical and Building Engineering, Politecnico di Torino, Italy*
11:40-12:30	**POSTER SESSION**
12:30-14:00	**LUNCH BREAK** ***- Széchenyi Restaurant***
14:00-17:50	**Oral Session 1: Bio-, Geo-, and Structural Mechanics**
18:00-19:30	**DINNER BREAK** ***- Széchenyi Restaurant***

Wednesday, July 31, 2024		**Location** *Management Campus of SZE*
09:00-12:35	**Oral Session 2A: Strength of Materials**	**MC001 (Ground Floor)**
09:00-12:10	**Oral Session 3A: Applied Mechanics**	**MC002 (Ground Floor)**
12:35-14:00	**LUNCH BREAK**	***- Széchenyi Restaurant***
14:00-17:30	**Oral Session 2B: Strength of Materials**	**MC001 (Ground Floor)**
14:00-17:25	**Oral Session 3B: Applied Mechanics**	**MC002 (Ground Floor)**
18:00-19:30	**DINNER BREAK**	***- Széchenyi Restaurant***

Thursday, August 1, 2024	**One Day Tour in Győr City**
09:40-10:00	Gathering at the Gate of Széchenyi István University
10:00-12:00	**Sightseeing in Győr city**
12:00-14:00	Lunch Time
14:00-16:00	**Pannonhalma Abbey**

Note:

***** Please take your Tour Ticket while getting on the tour bus.

*This is a tentative itinerary. The final schedule is subject to slight adjustments based on actual arrangements made by the tour guide.

Part II Keynote Speeches

Keynote Speech 1: Materials Science-Based Guidelines to Develop Robust Hard Thin Film Materials

Prof. Paul H. Mayrhofer
Institute of Materials Science and Technology,
TU Wien, Austria

Biography: Paul Mayrhofer has pioneered age hardening within ceramic thin films and is fascinated by phase transitions in general. His research activities focus on developing nanostructured materials by a combination of computational and experimental material science. He won some prestigious prizes and served scientific societies in numerous appointed and elected positions. He is an elected member of the Austrian Academy of Sciences. In 2018 he was appointed Fellow of the American Vacuum Society (AVS). Since 2020 he has been the Delegate for Materials Science at the Austrian Science Fund. In 2023 he won the Bill Sproul Award of the AVS for his seminal contributions to materials-science-based guidelines for improved thermal stability, strength and toughness of nitride and boride-based thin film. He has published more than 330 SCI-listed papers in the general field of thin film materials science, with >16,700 citations to these (h-index of 69; GS), and holds 13 patents regarding hard coatings.

Abstract. For mechanically dominated load profiles, nitrides are preferred as the base material for structural and functional hard coatings, while oxide-based materials offer better protection against high-temperature corrosion (such as oxidation). Thus, when mechanical and thermal loads are combined, the nitrides used should also have excellent stability against temperature and oxidation. How to develop such nitride materials that can withstand both high mechanical and thermal loads is the focus of this review article. This is done primarily with the help of experimental and theoretical investigations of the Ti–Al–N system.

On the basis of transition metal nitride coatings, we discuss important material development guidelines for improved strength, fracture toughness as well as thermal stability and oxidation resistance. Using various superlattice coatings, we further discuss how such nanolamellar microstructures can improve both the strength and fracture toughness of hard coating materials. In addition, other concepts for improving fracture toughness are discussed, with a focus on those that can increase both fracture toughness and hardness.

The individual concepts allow to design materials to meet the ever-growing demand for coatings with a wide range of excellent properties and outstanding property combinations.

Keynote Speech 2: Carbon-Reinforced Concrete - An Innovative Material for Structural Applications

Prof. Dr. -Ing. Klaus Holschemacher
Structural Concrete Institute (IfB),
Leipzig University of Applied Sciences (HTWK Leipzig), Germany

Biography: Klaus Holschemacher studied Civil Engineering at the Technical University of Leipzig (TH Leipzig) and has got PhD degree from this university in 1992. Since 1996 he is Professor for Structural Concrete at the Leipzig University of Applied Sciences (HTWK Leipzig). He is the founding director of the Structural Concrete Institute (IfB) and the head of this institution until now. Holschemacher has successfully applied for research funds with a total amount of more than 10 million €. His main research interests are carbon and textile reinforced concrete, fibre reinforced concrete, hybrid structures, and bond of reinforcement in cementitious materials.

Holschemacher is author, respectively co-author, of more than 400 research papers. He is member of numerous scientific organizations, e.g. fib, ACI, ASCE. Since 2018, he is board member of the German Carbon Concrete Composite e.V. Besides his activities in research, he is working as consulting engineer and as publicly appointed and sworn expert.

Abstract. Carbon-reinforced concrete (CRC) is characterized by the replacement of traditional steel bar or steel mesh reinforcement by carbon fibre reinforced polymer (CFRP) based grids or bars. Because, in contrast to steel, the CFRP reinforcement cannot corrode, the concrete cover may be reduced to essentially lower values, just needed for ensuring a sufficient bond behaviour between reinforcement and surrounding concrete. In the result, the total height of CRC members may be decreased without reduction of their load-bearing capacity in many cases. It means, in other words, that with lowered volume of concrete the same resistance of the structure is achievable. Thus, application of CRC can provide an important contribution towards improved sustainability and save natural resources.

The paper describes the basics of the design of CRC members. For this, the partial safety factor and the design value of material strength of CFRP reinforcement is discussed.

Following, the particularities in the construction of precast CRC elements are described. In detail, the possibilities and challenges of automized production using robotics are introduced. Thereby, it is advantageous to use the electrical conductivity of the carbon fibres. Besides their contribution to the structural resistance, the carbon reinforcement may be used for signal processing or near to surface heating.

It may be expected that CFRP reinforcement replaces the ordinary steel reinforcement in concrete members in near future. Already now, there are many applications of CRC in construction practice. They verify impressively the high performance of CRC.

Keynote Speech 3: The Importance of Including Constructability Criteria and Sustainability Aspects within the Optimal Design Process

Prof. Giuseppe Carlo Marano
Department of Structural, Geotechnical and Building Engineering, Politecnico di Torino, Italy

Biography: Prof. Giuseppe Carlo Marano is a structural engineer, and internationally recognized for his research and expertise in the field of structural optimization in new or existing buildings or bridges and in identification and characterization of bridges and structures and seismic protection. His international experience is quite extensive, as he has been a Visiting assistant professor at Cambridge (2002), associate professor in 2011 at Politecnico di Bari, visiting Professor at Loughborough University (2012) and at Hunan University (China) in 2014. He has been research fellow at the SIBERC (Sustainable and Innovative Bridge Engineering Research Center) at the Fuzhou University (China) since 2014; at the same university he had been full Professor in Structural Design from 2015 to 2018. From 2018, he is full professor in Structural Design at Politecnico di Torino.

Abstract. In the last century, the strong limitations of the available optimization approaches demonstrate the importance of a change of paradigm in the problem formulation of the optimization problem. The real challenge is the development of optimal strategies for reducing structural complexity in situ and minimizing material waste resulting in significant economic and environmental cost-saving.

This seminar is focused on the implementation of innovative optimization strategies for solving multi-criteria problems in which the structural design of civil buildings complies with the sustainability goals of this century and the constructability needs occurring during the construction stage. The feasibility of the proposed approach will be demonstrated for real-world structures and the crucial role of Carbon footprint (CO_2) in the design process will be assessed. All the stages of the construction process have been involved in the optimization tool by performing accurate Life Cycle Analyses (LCA). In this way, the identification of the most critical parameters (i.e. components of the structure) that control the construction process can be evaluated in terms of total environmental impact. Finally, a sustainable approach for reducing cutting losses in steel structures will be discussed.

Part III Poster Presentations

Poster Presentation Guidelines

Materials Provided by the Conference Organizer:

- X Racks & Base Fabric Canvases
- Adhesive Tapes or Clamps

X-Rack

Materials Provided by the Presenters:

- Home-Made Posters
- Posters Printed by Conference

Requirement for the Posters:

- Material: not limited
- Size: 160cm (height) ×60cm (width)
- Horizontal Head: please indicate your paper number '**MS******' in the head of the poster.

Best Poster Presentation Selection Procedure

Samples of Stickers

Selection Criteria:

- Research Quality
- Presentation Skill
- Design

Selection Procedure:

- 10 volunteers will be invited from the participants to serve as the judges to review the posters (Note: A judge would not have a poster or know the participant exhibiting a poster)
- 2 red stickers and 2 green stickers will be provided to the judges. The red sticker stands for "Research Quality" with a value of 2 points; the green sticker stands for "Presentation Skill and Design" with a value of 1 point
- Each judge will go around the poster session and give the stickers to the poster which he/she thinks is of high quality or well designed and well presented, please be noticed that the judge cannot give 2 red or 2 green stickers to the same poster (one red and one green sticker are acceptable)
- After the poster session, the conference secretary will count the points from each poster and one best poster presentation with more points will be selected. If there is a tie, the one with more red (Research Quality) stickers wins.

Nature of the Award

- This award consists of free registration to the MSAM 2025 and a certificate.
- **Two Best Poster Presenters** will be selected after session finishes with certificate issued and results announced on MSAM 2025 website.

List of Posters

Time: 11:40-12:30 Tuesday, July 30, 2024
Location: Outside of Room MC001-MC002 (Ground Floor)

MS1958	**Response of Apples under Different Loading Conditions** *Dr. Zbigniew Stropek, Department of Mechanical Engineering and Automation, University of Life Sciences in Lublin, Poland*
MS1959	**Roton-Enabled Mechanical Diode at Extremely Low Frequency** *Prof. Tianzhi Yang, School of Mechanical Engineering and Automation, Northeastern University, China*
MS1965	**Influence of Carbonated and Non-Carbonated Alkaline Residues on the Mechanical Behavior and Macroporosity of Binary Blended Eco-Cements** *Dr. Moisés Frías, Eduardo Torroja Institute for Construction Sciences (IETcc-CSIC), Spain*
MS1971	**The Fabrication of Copper Oxide Microheater Using a Selective Picosecond Laser-Induced Technique** *Prof. Chien Ping Wang, Department of Mechanical Engineering, National Taipei University of Technology, Taiwan*
MS1992	**Dual Projection Structured Light Method for Real-Time Out-of-Plane Deformation Analysis** *Dr. Jorge Ramón Parra-Michel, Facultad de Ingeniería y Tecnologías, Universidad La Salle Bajío, México*
MS1994	**Tailoring Metallic Bio-interface Properties Induced by Ultrafast Laser Processing Technique for Biological Response** *Prof. Tien-Li Chang, Department of Mechatronic Engineering, National Taiwan Normal University, Taiwan*
MS2002	**Mechanical Properties of Acid Activated Metakaolin** *Dr. Martin Keppert, Department of Materials Engineering and Chemistry, Czech Technical University in Prague, Czech Republic*
MS2010	**Effect of Ti Addition and Electric Field on Microstructure and Mechanical Properties of the Al-Si-Fe Hypereutectic Alloy** *Dr. Lin Wang, Shenzhen Institute, Peking University, China*
MS2016	**Change in Stiffness of Reinforced Concrete Tunnel Walls and Its Effect under Fire Load** *Dr. Edina Koch, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
MS2017	**Finite Element Analysis of Microtunneling under a Railway Track** *Dr. Edina Koch, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
MS2020	**Comparative Study of Model Order Reduction Methods via Truss Vibrations** *Mr. Peter Horvath, Department of Applied Mechanics, Széchenyi István University, Hungary*

MS2021	**Analysis of Transient-like Vertical Acceleration Events on Semi-Trailer Truck to Simulate Package Testing** *Dr. Renata Pidl, Department of Applied Mechanics, Széchenyi István University, Hungary*
MS2024	**Application Analysis of a Novel Reduction Method for Spurious Oscillations in 2D Impact Problems** *Mr. Dániel Serfőző, Department of Applied Mechanics, Széchenyi István University, Hungary*
MS2033	**Knee Extensors Muscle to Tendon Area Ratio Associated with Mechanical Efficiency** *Dr. Kovács Bálint, Faculty of Sports Science, Ningbo University, China*
MS2037	**Predicting Natural Frequencies of a Cantilever Using Machine Learning** *Mr. Krisztián Horváth, Audi Hungaria Faculty of Automotive Engineering, Széchenyi István University, Hungary*
MS2040	**Shear Buckling Resistance of I-beams with Partially Stiffened Webs** *Dr. Gábor Hajdú, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
MS2042	**Calculation of Heating of Reinforced Concrete Tunnel Wall during Fire** *Dr. Szép János, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
MS2044	**Calculation Possibilities of the Local Fire Effect for the Examination of Bridge Superstructures** *Dr. Szép János, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
MS2045	**Calculation of Thermal Stresses of Cast Iron Tubbings under Fire Effect** *Dr. Szép János, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
MS2049	**Analysis and Measurement of Bending Stiffness of Wound String According to Higher Order Frequencies** *Dr. Mate Antali, Department of Applied Mechanics, Széchenyi István University, Hungary*
MS2068	**Proposal of a New Method for Measuring Wear Scars Using Deep Learning** *Prof. Sung-Ho Hong, Department of Mechanical System Engineering, Dongguk University -WISE, Republic of Korea*
MS2072	**Film-Wise and Filament-Wise Pumping-Up Phenomena by Using a Rotating Cone** *Prof. Takahiro Adachi, Department of Systems Design Engineering, Akita University, Japan*
MS2084	**Supercontinuum Generation from Thin Plates** *Prof. Jav Davaasambuu, Laser Research Center, School of Arts and Sciences, National University of Mongolia, Mongolia*
MS2089	**Polydopamine Assisted Electrochemical Deposition of Mineralized Collagen Coatings** *Prof. Kui Cheng, School of Materials Science & Engineering, Zhejiang University, China*

MS2093	**Mechanical Properties and Microstructure of 3D Printed Porous 17-4PH Stainless Steel for Industrial Use** *Dr. Gyorgy Thalmaier, Materials Science and Engineering Department, Technical University of Cluj-Napoca, Romania*
MS2095	**Effect of Strengthening Steel Structures with Carbon Fiber Reinforced Polymer (CFRP)** *Dr. Wojciech Macek, Faculty of Mechanical Engineering and Ship Technology, Gdańsk University of Technology, Poland*

Part IV Oral Presentations

General Guidelines

- Duration for Invited Oral Presentation: 20 Minutes of Presentation including 3-5 Minutes of Q&A;
- Duration for Regular Oral Presentation: 15 Minutes of Presentation including 2-3 Minutes of Q&A;
- All presenters are requested to reach the Session Room 15 minutes prior to the schedule time and complete their presentation on time;
- Presenters should prepare Power Pointer or PDF Files for Presentation with Paper ID (**MS****) marked in the last page;
- Signed and stamped presentation certificate would be issued after each presentation.

Oral Presentation Guidelines

Devices Provided by the Conference Organizer:

- Laptops (with MS-Office & Adobe Reader)
- Projectors & Screen: Ratio 4:3
- Laser Sticks
- Microphones
- Please send us the PowerPoint once it is ready and have the PPT back up in a U-disk. For presenters who do not send the PowerPoint, please save it in the laptop of the corresponding session 15 mins in advance. Kindly tell the Session Chair (before the start of your session) that you are presenter.

Best Oral Presentations Selection Guidelines

Selection Criteria:

ONE best presentation will be selected from EACH session based on the following criteria:

- ✓ Research Quality
- ✓ Presentation Performance
- ✓ Presentation Language
- ✓ Interaction with Listeners
- ✓ PowerPoint Design
- ✓ Effective Communications

Selectin Procedure:

- ✓ An assessment sheet will be delivered to listeners before the session;
- ✓ Write the numbers of two best presentations and submit the filled assessment sheet (with the listener's name and signature) to the Session Chair before the session termination.
- ✓ The Session Chair will count the votes for each presentation and name the winner based on the maximal number of votes. The Session Chair has three votes but can use only one in favor of his/her own presentation (if any). To avoid any conflict of interests, only registered listeners are entitled to vote.

Nature of the Award:

- ✓ This award consists of free registration to the next conference MSAM 2025 and a certificate;
- ✓ The awards will be announced on the official website after the conference.

Assessment Sheet Sample

MSAM 2024 Oral Presentation Assessment

Dear participants,

After carefully listening to the presentations of this session, please kindly recommend two excellent Oral Presentations with reference to the following evaluation criteria.

The Session Chair will count the votes from each presentation and select ONE Best Oral Presentation in this session. If there is a tie, the Session Chair will make the final decision.

The winner will be announced at the official website after the conference.

You can refer to the following Criteria:

Items	Assessment
Content	Right, Logical, Original, Well-Structured
Language	Standard, Clear, Fluent, Natural
Performance	Spirited Appearance, Dress Appropriately, Behaves Naturally
PPT	Layout, Structure, Typeset, Animation, Multimedia
Reaction	Build a Good Atmosphere, Speech Time Control Properly

Please write down paper ID and give reasons for your recommendation:

Paper ID	Reasons

Evaluated by: _____ (Paper ID: _____)

Note: When the session finished, please fill it out and give it to the Session Chair so that the Best Oral Presentation in this session can be selected.

Oral Session 1: Bio-, Geo-, and Structural Mechanics

Time: 14:00-17:50 Tuesday, July 30, 2024
Conference Room: MC001-MC002 (Ground Floor), Management Campus of SZE
Session Chair (14:00-15:40): Dr. Gusztáv Fekete, Széchenyi István University, Hungary
Session Chair (16:00-17:50): Prof. Giuseppe Carlo Marano, Politecnico di Torino, Italy
Co-Chair (16:00-17:50): Dr. Raffaele Cucuzza, Politecnico di Torino, Italy

14:00-14:15	**MS2000**	**Comparison of Mechanical Properties of PLA-Based Biocomposites Filled with Different Agricultural By-Products** *Mr. Sándor Kálmán Jakab, Department of Materials Science and Engineering, Széchenyi István University, Hungary*
14:15-14:30	**MS2007**	**Biomechanical Analysis of Lower Limb Joints in Table Tennis: A Comparative Study Between Chasse Step and One-Step Using OpenSim** *Mr. Penghui Zhang, Faculty of Sports Science, Ningbo University, China*
14:30-14:50	**MS2011**	**Computational Wear Prediction in Total Knee Replacements as a Function of Replacement Size** *Dr. Gusztáv Fekete, AUDI Hungária Faculty of Automotive Engineering, Széchenyi István University, Hungary*
14:50-15:05	**MS2085**	**Finite Element Analysis of Impact Forces in Running: Evaluating Footwear Strike Patterns, and Load Transfer** *Mr. Debiprasad Senapati, Department of Applied Mechanics and Biomedical Engineering, Indian Institute of Technology Madras, India*
15:05-15:20	**MS2005**	**Mechanical Fatigue Test of Individual Dental Implants** *Dr. Ibolya Zsoldos, Department of Materials Science and Technology, Széchenyi István University, Hungary*
15:20-15:40	**MS2050**	**Investigation of Implants and Prostheses Through Biomechanics and Computer-Aided Numerical Solutions** *Prof. Kadir Gök, Biomedical Engineering, Bakircay University, Turkey*
15:40-16:00		**COFFEE BREAK**
16:00-16:15	**MS1968**	**Fatigue Life Improvement by Reducing Welding Residual Stress with Local Heating for Steel Bridge Members** *Dr. Hirohata Mikihito, Department of Civil Engineering, Osaka University, Japan*
16:15-16:30	**MS2091**	**Stiffness Ratio Evaluation of Steel Exoskeletons Through Performance-Based Optimal Design** *Ms. Jana Olivo, Department of Structural, Geotechnical and Building Engineering, Politecnico di Torino, Italy*
16:30-16:45	**MS2013**	**Non-Linear Time History and Pushover Analysis of a Steel Silo Behavior** *Dr. Oveys Ghodousian, Department of Civil Engineering, Takestan Branch, Islamic Azad University, Iran*

16:45-17:00	**MS2075**	**Assessing Local Site-Specific Response Spectra Based on Site Data in Győr** *Dr. Orsolya Kegyes-Brassai, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
17:00-17:20	**MS2094**	**An Alternative Approach for Reversing the Structural Design Process: from the Traditional Minimum-Weight Approach to the Cutting Losses Minimization** *Dr. Raffaele Cucuzza, Department of Structural, Geotechnical and Building Engineering, Politecnico di Torino, Italy*
17:20-17:35	**MS2088**	**Innovative Joint for Timber Based on Polymers as One of the Means of Reducing Energy Demand in Single Family Housing** *Dr. Patrycja Haupt, Faculty of Architecture, Cracow University of Technology, Poland*
17:35-17:50	**MS2090**	**Model Calibration of High Damping Rubber Bearings: A Preliminary Mass production Reliability Study** *Mr. Santiago Londoño Lopez, Department of Structural, Geotechnical and Building Engineering, Politecnico di Torino, Italy*

Oral Session 2A: Strength of Materials

Time: 09:00-12:35 Wednesday, July 31, 2024
Conference Room: MC001 (Ground Floor), Management Campus of SZE
Session Chair: Prof. Klaus Holschemacher, Leipzig University of Applied Sciences (HTWK Leipzig), Germany

09:00-09:15	**MS1993**	**Discrete Element Modelling Analysis of Particle Breakage Criteria in Direct Shear Tests** *Dr. Mohamed Amine Benmebarek, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
09:15-09:35	**MS1961**	**Mechanical Strength of SZO-PTFE and ZnO-PTFE Films for High-Sensitivity Touch Sensor Applications** *Prof. Soon-Gil Yoon, Department of Materials Science and Engineering, Chungnam National University, Republic of Korea*
09:35-09:50	**MS2001**	**Truck Load Positions Effect on Dynamic Behavior of Fractured Steel Box Girder Bridge** *Ms. Marame Brinissat, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
09:50-10:05	**MS2056**	**The Effect of the Friction Coefficient Between the Steel-Concrete Connection on the Horizontal Load Capacity** *Mr. Dániel Gosztola, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
10:05-10:25	**MS1957**	**On Fatigue Damage Definition and Failure Probability Prediction in Probabilistic Framework** *Prof. Liyang Xie, School of Mechanical Engineering and Automation, Northeastern University, China*

10:25-10:40	**MS2019**	**DEM Analysis of Ballast Particle Direct Shear Tests: Exploring the Influence of Varying Particle Size Distributions on Shear Stress** *Mr. Jafar Chalabii, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
10:40-11:00		**COFFEE BREAK**
11:00-11:15	**MS2041**	**Accuracy of the Different Machine Learning Models to Predict the Elastic Lateral-Torsional Buckling Moments of Corrugated Web Beams** *Dr. Gábor Hajdú, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
11:15-11:30	**MS2043**	**Conservative Method for the Calculation of Thermal Forces in Reinforced Concrete Tunnel Wall During Fire** *Dr. Szép János, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
11:30-11:50	**MS2074**	**Failure Analysis of Carbon Fiber Reinforced Composites after Lightning Strike** *Prof. Kunkun Fu, School of Aerospace Engineering and Applied Mechanics, Tongji University, China*
11:50-12:05	**MS1966**	**Microscopic Characterization of Adiabatic Shear Bands in Additively Manufactured 316L Stainless Steel Hat-Shaped Specimens** *Mr. Hao Xue, State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology, China*
12:05-12:20	**MS2079**	**Evaluating the Reliability of Hinge Definitions in Pushover Analyses: A Comparative Study of SAP2000, AxisVM** *Mr. Kevin Karanja Kuria, Department of Structural Engineering and Geotechnics, Széchenyi István University, Hungary*
12:20-12:35	**MS2060**	**Analytical Study of Steel-Polypropylene Hybrid Fibre-Reinforced Concrete Deep Beams with Different Shear Span-to-Depth Ratios** *Dr. Sarah Khaleel Ibrahim, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*

Oral Session 3A: Applied Mechanics

Time: 09:00-12:10 Wednesday, July 31, 2024
Conference Room: MC002 (Ground Floor), Management Campus of SZE
Session Chair: Prof. Tianzhi Yang, Northeastern University, China

09:00-09:15	**MS1989**	**Finite Element Modelling of Polymer and Crumb Rubber Modifed Asphalt Mixtures** *Mr. Mohammad Fahad, Department of Transport Infrastructure and Water Resources Engineering, Széchenyi István University, Hungary*
09:15-09:30	**MS1996**	**Performance of Calcined Brick Soils on Mechanical Properties of Blended Cement** *Dr. Dana Koňáková, Department of Materials Engineering and Chemistry, Czech Technical University in Prague, Czech Republic*

09:30-09:45	**MS1984**	**Mechano-Optical Response of Liquid-Crystal Elastomers and Their Application in Strain Sensors** *Dr. Kohsuke Matsumoto, Department of Applied Chemistry, Ritsumeikan University, Japan*
09:45-10:00	**MS2008**	**An Alternative Mooney-Rivlin Material Model for Finite Strain Plasticity** *Dr. Ladislav Écsi, Faculty of Mechanical Engineering, Slovak University of Technology in Bratislava, Slovakia*
10:00-10:15	**MS2027**	**Numerical Modeling of Multi-pass Arc Welding Processes: Integration with Experimental Validation for Distortion Analysis and Characterization** *Mr. Grubits Péter, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
10:15-10:35	**MS1985**	**Three-Dimensional Meta-Composite of High Thermal-Dimensional-Stability** *Dr. Yuan Chen, Shenzhen Key Laboratory of Intelligent Manufacturing for Continuous Carbon Fibre Reinforced Composites, Southern University of Science and Technology, China*
10:35-10:55		**COFFEE BREAK**
10:55-11:10	**MS2058**	**A Comparative Study of Graphite Growth in Cast Iron** *Mr. Ramon Suarez, Azterlan, Basque Research and Technological Alliance (BRTA), Spain*
11:10-11:25	**MS2067**	**Numerical Analysis for Appropriate Positioning of Ferrous Particle Sensor with Permanent Magnet in Gearbox Systems** *Prof. Sung-Ho Hong, Department of Mechanical System Engineering, Dongguk University -WISE, Republic of Korea*
11:25-11:40	**MS2052**	**Energy Storage Capacity of Shape Memory Natural Rubber Nanocomposite Films** *Dr. Chai Ai Bao, Department of Mechanical, Materials and Manufacturing Engineering, University of Nottingham Malaysia, Malaysia*
11:40-11:55	**MS2051**	**Novel Technique for Reducing Geometrical Inaccuracies of Clamped Workpiece During Machining: A Hybrid Method** *Prof. Hajnalka Hargitai, Department of Materials Science and Technology, Széchenyi István University, Hungary*
11:55-12:10	**MS2063**	**Reliability-Based Optimization of Sinusoidal-Web Steel Beams: Integrating Experimental and Numerical Analyses for Enhanced Structural Performance** *PhD Imre Cserpes, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*

Oral Session 2B: Strength of Materials

Time: 14:00-17:30 Wednesday, July 31, 2024
Conference Room: MC001 (Ground Floor), Management Campus of SZE
Session Chair: Prof. Paul H. Mayrhofer, TU Wien, Austria

14:00-14:15	**MS1975**	**Probabilistic Topology Optimization of Steel I-Beam Web Configurations under Varied Load Positions** *Mr. Muayad Habashneh, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
14:15-14:30	**MS1978**	**Investigation of the Vertical Stability of Embedded Rail Structures** *Prof. Szabolcs FISCHER, Department of Transport Infrastructure and Water Resources Engineering, Széchenyi István University, Hungary*
14:30-14:50	**MS2071**	**Evolution of the ΔKeff Concept for Long and Short Fatigue/Fretting Fatigue Cracks and Marci Effect Substantiation** *Dr. Alexander Khotsianovsky, Pisarenko Institute of Problems of Strength, National Academy of Sciences of Ukraine (PIPS NASU), Ukraine*
14:50-15:10	**MS1964**	**Effects of Temperature/Stress Coupled Field Ageing on the Fatigue Crack Propagation Behavior of Inconel 718 Superalloy** *Prof. Lei Wang, School of Materials Science and Engineering, Northeastern University, China*
15:10-15:25	**MS2006**	**The Effect of Rectangle Shaped Cutouts of Corrugated Paperboard Packages on Compressive Strength of Boxes** *Mr. Lajos Fehér, Department of Applied Mechanics, Széchenyi István University, Hungary*
15:25-15:40	**MS2029**	**Strengthening RC Slabs with CFRP Bars Using the Plastic Limit Method to Control Plastic Deformation** *Ms. Zahraa Saleem Sharhan, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
15:40-16:00		**COFFEE BREAK**
16:00-16:20	**MS2070**	**Short Fatigue Crack Behavior under Various Level of Mixed-Mode** *Dr. Lucie Malíková, Institute of Physics of Materials, v.v.i., Czech Academy of Sciences, Czech Republic*
16:20-16:35	**MS2039**	**Non-square Inverse Function Jacobians in Controlled Multibody Systems: An Illustrative Example** *Dr. Ambrus Zelei, Audi Hungaria Faculty of Automotive Engineering, Széchenyi István University, Hungary*
16:35-16:55	**MS2003**	**Optimizing Microstructure and Mechanical Properties of the Hot Forged Ti-6Al-4V Alloy Via Laser Shock Peening** *Prof. Liyuan Sheng, Shenzhen Institute, Peking University, China*
16:55-17:15	**MS2096**	**Tailor Morphology, Size and Distribution of Cementite to Improve Steels' Mechanical Properties** *Dr. Xiaodan Zhang, Department of Civil and Mechanical Engineering, Technical University of Denmark, Denmark*

17:15-17:30	**MS2047**	**Benchmark Analysis of Plastic Strain-Based Lifetime Estimation Fatigue Models in Aspect of SMD Component Standoff Height** *Mr. Antal BAKONYI, Audi Hungaria Department of Whole Vehicle Engineering, Széchenyi István University, Hungary*

Oral Session 3B: Applied Mechanics

Time: 14:00-17:25 Wednesday, July 31, 2024
Conference Room: MC002 (Ground Floor), Management Campus of SZE
Session Chair: Prof. Hajnalka Hargitai, Széchenyi István University, Hungary

14:00-14:15	**MS2022**	**Wave Propagation in Composite Metal Foams Investigated by Finite Element Methods in Two Dimensional Case** *Mr. Márió Kovács, Department of Applied Mechanics, Széchenyi István University, Hungary*
14:15-14:30	**MS2081**	**Inverse Design of Porous Composites with Strength Constraints** *Mr. Guangkai Wei, College of Aerospace Engineering and Mechanics, Tongji University, China*
14:30-14:45	**MS1986**	**Development of Injection Moulded Electromagnetic Pulse Shielded Polymer Cover** *Prof. Gábor Dogossy, Department of Materials Science and Engineering, Széchenyi István University, Hungary*
14:45-15:00	**MS1977**	**Experimental Verification of Periodic Control during Run-Up of a Flexible Rotor** *Mr. Muhammad Saad Fasih, Research Center for Microtechnology, Vorarlberg University of Applied Sciences, Austria*
15:00-15:20	**MS1962**	**A Novel Approach to Estimate Creep Rupture Life of the Co-Ni-Cr-W-Fe-Mn Superalloy by Multi-Station Compressive Creep Tests** *Prof. Qiang Zhu, Department of Mechanical and Energy Engineering, Southern University of Science and Technology, China*
15:20-15:35	**MS1990**	**Numerical Simulation to Assess Cutting Tool Wear During Sheet Metal Blanking** *Dr. Mohamed Rachik, Compiegne University of Technology, Roberval (Mechanics, Energy and Electricity), France*
15:35-15:55		**COFFEE BREAK**
15:55-16:10	**MS2028**	**Dynamics of Rolling Wheels with Elliptical Tread Profiles** *Dr. Gábor Kupi, Department of Applied Mechanics, Széchenyi István University, Hungary*
16:10-16:25	**MS2054**	**Prediction of Reverse Micro EDM Fabricated Tungsten Carbide Microelectrode Arrays Surface Roughness Using Artificial Neural Network** *Mr. Suresh Pratap, Production and Industrial Engineering, Birla Institute of Technology Mesra, India*

16:25-16:40	**MS2026**	**Improved Equations of the Classic Hunting Problem of Railway Wheelsets** *Mr. Ervin Finta, Department of Applied Mechanics, Széchenyi István University, Hungary*
16:40-16:55	**MS2092**	**Evaluation of Hot Rolling Mill Technical Parameters Regarding Stable Production of New Most Hardened Hot Steel Strip** *Dr. Seyed Mahmoud Mani,Mechanical Process Engineer, Hot Strip Mill, Mobarakeh Steel Company, Iran*
16:55-17:10	**MS1995**	**Numerical Study of the Geogrid Reinforced Soil Wall Incorporating Strain-Softening Constitutive Soil Model** *Mr. Vahid Shafaie, Department of Structural and Geotechnical Engineering, Széchenyi István University, Hungary*
17:10-17:25	**MS2061**	**Development of FEM Model to Simulate Radiosonde Collisions** *Mr. Norbert Hegyi, AUDI Hungária Faculty of Automotive Engineering, Széchenyi István University, Hungary*

Part V Conference Venue

Venue: Széchenyi István University

Address: 9026 Győr, Egyetem tér 1., Hungary
Tel.: +36 (96) 503 400
Website: https://www.uni.sze.hu/

Széchenyi István University (SZE) is located in Győr, at the centre of Central Europe's "golden triangle". It situates halfway between the capital of Hungary, Austria and Slovakia, along highway M15, on the river Danube. The main campus of The University of Győr (Széchenyi István University), situated on the banks of the Danube River and only minutes on foot from the downtown. As a dynamically developing Higher Education Institution with nearly 14,000 students, since 2016 the University has seen a rapid rise in the number of international students, now representing 70 nations.

The university has 45 years of tradition and experience in supporting Hungary's leading industries with a strong focus on vehicle engineering, transportation and telecommunication. It becomes the primary driver of the regional economy provider for the public service sector and supplies the human resources and training needs for the North-Transdanubian region.

Starting in 2015, Audi Hungaria and the University of Győr jointly founded the "Audi Hungaria Faculty of Automotive Engineering" which now boasts six professorships: internal combustion engines, automotive manufacturing technology, complete vehicle development, material science and technology, environmental engineering, logistics and shipping.

Campus Map:

Térkép jelzés	Épület neve
ÚT	Új-Tudástér épület
A, B, C, D	Tanulmányi épületek
K2, K3, K4	Hegedűs Gyula Kollégium
K0, K1	Multifunkciós Épület
E	"E" épület
L1, L2, L3	Labor Épület
G	Építész Műteremház
S1	Győr Városi Egyetemi Csarnok
S2	Kosárlabda Edzőcsarnok
IS	INNO-SHARE épület
LIB	Egyetemi Könyvtár
IG	Igazgatási Épület
I	INOK - Idegen Nyelvi Oktatási Központ Magyar Posta
F1	Járműhajtás Laboratórium
F2	Csomagolás és Környezetállósági Vizsgálólaboratórium
J	Deák Ferenc Állam- és Jogtudományi Kar épület
MOBILIS	Mobilis Interaktív Kiállítási Központ
BMT	Belsőégésű Motorok és Járműhajtások Tanszék
MC	Menedzsment Campus
P5, P6	Nyitott parkolózónák
P1, P2, P3, P4	Sorompóval elzárt parkolózónák

Access to Széchenyi István University

1. From Budapest Ferenc Liszt International Airport to Széchenyi István University

(1) Airport Shuttle Bus – Metro - Inter-city Rail RJX – Bus

From Budapest Ferenc Liszt International Airport, walk 3 min (150m) to station: Liszt Ferenc Airport 2, take airport shuttle bus **100E Airport Express**, get off at *Kálvin tér M* (30 min); walk about 3 min to the Metro station: *Kálvin tér M*, take **Metro M4** (towards Keleti pályaudvar), get off at *Keleti pályaudvar M*; Walk from Keleti pályaudvar M to *Budapest-Keleti* (3 min), take **Inter-city Rail RJX** to Gyor (about 1h 20 min); Walk from Gyor station to *Aradi vértanúk útja, szökőkút* (about 10 min); take **bus No. 11**, get off at the 3rd stop: Széchenyi István University (or just walk from Gyor station to Széchenyi István University, about 1.2miles, 24 min.).

Note: Airport Shuttle Bus 100E operates 24 hours a day, about every 15 minutes during the day, every 30-40 minutes at night. Ticket price: 2200 HUF.

(2) Taxi - Inter-city Rail RJX – Bus

From Budapest Ferenc Liszt International Airport, take a **Taxi** to *Budapest-Keleti* (Railway Station), take **Inter-city Rail RJX** to Gyor (about 1h 20 min); Walk from Gyor station to *Aradi vértanúk útja, szökőkút* (about 10 min); take **bus No. 11**, get off at the 3rd stop: Széchenyi István University (or just walk from Gyor station to Széchenyi István University, about 1.2miles, 24 min.).

2. From Vienna International Airport (Austria) to Széchenyi István University

Inter-city Rail RJX - Inter-city Rail RJX – Bus (2h 16 min)

From Vienna International Airport, walk 2 min to *Flughafen Wien Bahnhof*, take **Inter-city Rail RJX** (towards Innsbruck Hbf), get off at *Wien HBF* (about 20 min); take **Inter-city Rail RJX** (towards Budapest-Keleti) to Gyor, get off at *Gyor* (1 h 10 min); Walk from Gyor station to *Aradi vértanúk útja, szökőkút* (about 10 min); take **bus No. 11**, get off at the 3rd stop: Széchenyi István University (or just walk from Gyor station to Széchenyi István University, about 1.2miles, 24 min).

Part VI Acknowledgements

On behalf of the MSAM 2024 Organizing Committee, we would like to take this opportunity to express our sincere gratitude to our participants for their active engagement and contributions. With their enthusiastic participation, the richness and vibrancy of the conference experience will be impressive. We also extend our acknowledgements to the esteemed members of the Technical Program Committee whose meticulous evaluations, underpinned by a wealth of expertise, were instrumental in upholding the high standard in academia within the discipline. Their professional guidance and insightful feedbacks have guided the authors to improve their research work to new heights. Last but not least, we share our deep appreciations to those who contributes to the success of the conference organization without listing their names here.

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