

CMM-SoLMech 2022

CONFERENCE PROGRAMME

24th International Conference on Computer Methods in Mechanics (CMM)
42nd Solid Mechanics Conference (SolMech)

CMM-SolMech 2022

Organized by

Institute of Fundamental Technological Research, Polish Academy of Sciences
West Pomeranian University of Technology in Szczecin
Polish Association for Computational Mechanics

Under the auspices of

Committee on Mechanics of the Polish Academy of Sciences

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Outline of the conference programme

	Monday, 05/09	Tuesday, 06/09	Wednesday, 07/09	Thursday, 08/09
08:30	<i>Opening Ceremony</i>	<i>Plenary talk #4</i>	<i>Plenary talk #6</i>	
09:20	<i>Plenary talk #1</i>	<i>Plenary talk #5</i>	<i>Plenary talk #7</i>	
10:10	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	<i>Excursion Świnoujście harbour cruise</i>
10:40	Parallel sessions	Parallel sessions	Parallel sessions	
12:40	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>
14:00	<i>Plenary talk #2</i>	Parallel sessions	Parallel sessions	
14:50	<i>Plenary talk #3</i>			
15:40	<i>Coffee break</i>	<i>Coffee break</i>	<i>Coffee break</i>	
16:10	Parallel sessions	Parallel sessions	<i>Plenary talk #8</i>	
19:00	<i>Welcome reception & Poster session</i>	<i>General Assembly of the Polish Association for Computational Mechanics</i>	<i>Conference Dinner & Closing Ceremony</i>	

Notes

Monday, September 5, 2022

08:30 – 09:20

Opening Ceremony

09:20 – 10:10

Plenary session P1

09:20 Jože Korelc

Sensitivity analysis based computational modeling

10:10 – 10:40

Coffee break

10:40 – 12:40

Parallel sessions

12:40 – 14:00

Lunch

14:00 – 15:40

Plenary session P2

14:00 Thomas Pardoen

On-chip fracture mechanics to explore fracture toughness of freestanding ultra-thin films from brittle to ductile, down to 2D materials

14:50 Laura De Lorenzis

EUCLID: Efficient Unsupervised Constitutive Law Identification and Discovery

15:40 – 16:10

Coffee break

16:10 – 18:10

Parallel sessions

19:00 – 21:00

Welcome reception & Poster session

Room R1: S05-1 Micromechanics of heterogeneous materials

- 10:40 *FFT based numerical study of elastic wave propagation in heterogeneous media: application to polycrystals* – J. Segurado – **Keynote**
- 11:20 *Impact of fibre orientation distribution reconstruction accuracy on composite's behaviour prediction* – W. Ogieman
- 11:40 *Application of mechanical equivalence hypothesis to composite effective properties estimation* – A. Wiśniewska, H. Egner [Moved to: Mon, R1, S05-2, 17:50]
- 12:00 *The effect of inclusion spatial distribution: modelling and experimental validation* – K. Kowalczyk-Gajewska, K. Bieniek, M. Maj, M. Majewski, K. Opiela, T. Zieliński
- 12:20 *Lamination-based efficient treatment of weak discontinuities for non-conforming finite-element meshes* – J. Dobrzański, K. Wojtacki, S. Stupkiewicz

Room R2: S17-1 Computational and experimental advanced mechanics in engineering applications

- 10:40 *Protection of urban spaces* – N. Gebbeken – **Keynote** [Cancelled]
- 11:20 *Verification of blast mitigating potential of hedges in real applications* – T. Gajewski, R. Studziński, M. Malendowski, P. Peksa, W. Sumelka, P. W. Sielicki
- 11:40 *Experimental-numerical methods for studying shock-induced fracture of rock* – P. Baranowski, M. Kucewicz, J. Małachowski, M. Pytlak
- 12:00 *Assessment of the safety procedures during defusing of unexploded ordnance* – P. Nowak, T. Gajewski, P. Peksa, P. W. Sielicki
- 12:20 *Experimental and numerical investigation of material and damage behaviour of 3D printed polyamide 12* – D. Schob, R. Roszak, K. Kotecki, D. Kurpisz, M. Ziegenhorn [Moved to: Tue, R3, S12-4, 18:10]

Room R3: S03-1 Experimental mechanics

- 10:40 *Studying dynamic fragmentation of metallic materials via axial penetration of thin-walled cylinders* – J. C. Nieto-Fuentes, J. A. Rodriguez Martinez
- 11:00 *Influence of local core deformations on the load-bearing capacity of sandwich panels* – M. Chuda-Kowalska, M. Malendowski, Z. Pozorski
- 11:20 *Yield surface identification of titanium alloy and its evolution reflecting complex pre-deformation* – V. P. Dubey, M. Kopeć, Z. Kowalewski
- 11:40 *Experimental fire-exposure study on glue laminated timber and wood-CFRP composite beams* – B. Kawecki, M. Pieńko, T. Lipecki, A. Stachowicz
- 12:00 *Experimental tests and numerical analysis of the truss with compressed bottom chord* – M. Krajewski

12:20 *Experimental study of structural acoustic flows in open-ended circular and square waveguides* – S. Weyna

Room R4: S06-1 Multiphysics problems

10:40 *Phase field models for multi-physics problems: applications to hydrogen embrittlement and Li-ion battery degradation* – E. Martinez-Paneda – **Keynote**

11:20 *Spline-based multi-field computations of optimized silicon electrodes* – M. Werner, K. Weinberg

11:40 *Application of deep learning methods for efficient multi-scale modeling of solid-state batteries going under degradation* – S. Rezaei, A. Asheri, M. Fatihdoost, B. Xu [Cancelled]

12:00 *Modelling of chemo-mechanical processes in energy storage materials* – M. Poluektov, Ł. Figiel

Room R5: S11-1 Particle-based methods in computational mechanics

10:40 *Modelling of fluid flow in porous materials using a DEM-based novel coupled thermo-hydro-mechanical mesoscopic approach* – M. Krzaczek, M. Nitka, J. Tejchman – **Keynote**

11:20 *DEM simulation of thin elastic membranes for granular jamming applications* – H. Götz, P. Müller, T. Pöschel

11:40 *The Particle Finite Element Method in solid mechanics – Aspects on contact mechanics and plasticity* – M. Schewe, A. Menzel

12:00 *Simulation of elastic wave propagation in concrete using Discrete Element Method* – M. Knak, M. Nitka, J. Tejchman, M. Rucka

12:20 *Investigation of the behavior of intact and cracked steel plates under static and dynamic loading* – M. Khomami Abadi, M. Zaman Kabir [Cancelled]

Room R6: S10-1 Parallel computing

10:40 *Matrix-free solver for fluid-structure interaction problems in ALE formulation* – M. Wichrowski, P. Krzyżanowski, S. Stupkiewicz, L. Heltai

11:00 *Real-time Operational Load Monitoring of a composite aerostructure using FPGA-based computing system* – W. Mucha

11:20 *Parallel approach to the design of nanostructures* – W. Kuś

11:40 *Accelerating computation of reduced order model of a structural system using GPU programming* – P. Górecki, M. Kalinowski, Ł. Jeziorek, J. Broniszewski, T. Koziara

12:00 *Parallel optimization of automotive shock absorber* – P. Sebastian, W. Kuś

12:20 *Cellular automata based multiscale simulations on low power microcomputers in edge architecture* – P. Hajder, Ł. Rauch

Room R1: S05-2 Micromechanics of heterogeneous materials

- 16:10 *Analysis of composites with interphases* – H. Altenbach, L. Nazarenko, H. Stolarski
- 16:30 *Contact analysis of branched crack surfaces by the Boundary Element Method* – P. Fedeliński
- 16:50 *Mesoscopic simulations of fracture in RC beams using DEM* – M. Nitka, J. Tejchman
- 17:10 *Experimental analysis and numerical modelling in the framework of fractional calculus of self-healing phenomena in roofing felts* – B. Łuczak, W. Sumelka
- 17:30 *On the representativeness of the statistical volume elements in computational homogenization* – M. Wojciechowski
- 17:50 *Moving layers and graded damage coupling with elasto-plasticity* – C. Stolz [Cancelled]

Room R2: S17-2 Computational and experimental advanced mechanics in engineering applications

- 16:10 *Experiment, modeling and simulation of sandwich plates with focus on parameter identification* – S. Hartmann, P. K. Dileep
- 16:30 *Modelling of plane framework structures made of laminated composite beams* – P. Szeptyński
- 16:50 *Numerical simulations and laboratory tests structural system made of sigma type cold-formed profiles* – A. Denisiewicz, K. Kula, T. Socha
- 17:10 *Fracture energy of wooden members under contact explosion* – A. Szlachta, P. Sielicki, T. Grajewski
- 17:30 *Numerical homogenization of multi-walled corrugated cardboard with imperfections* – D. Mrówczyński, T. Garbowski
- 17:50 *The influence of mounting place of FBG sensor in composite on the base of FEM simulations* – I. Jiregna, W. Kuś, W. Mucha

Room R3: S12-1 Plasticity, damage and fracture mechanics

- 16:10 *Micropolar crystal plasticity model with the gradient-enhanced incremental hardening law* – M. Ryś, S. Stupkiewicz, H. Petryk
- 16:30 *A discussion on the construction of dissipative microstresses in a gradient crystal-plasticity model* – H. Pouriayevali
- 16:50 *Experimental and numerical analysis of Lueders bands and PLC effect in AW5083 aluminium alloy* – M. Mucha, L. Rose, B. Wcisło, A. Menzel, J. Pamin
- 17:10 *Gradient damage models for simulation of concrete cracking in L-shape specimen* – A. Wosatko, J. Pamin

17:30 *Phase-field length scale measurement based on the fractography: a case study of Cr-Al₂O₃ composites* – H. Darban, K. Bochenek, W. Węglewski, M. Basista

Room R4: S06-2 Multiphysics problems

16:10 *Computational prediction of micro-crack and porosity induced changes in electrical conductivity* – A. Menzel, T. Kaiser

16:30 *Effects of multistable configurations in extremely soft magnetorheological elastomers* – M. Rambausek, M. Neunteufel, J. Schöberl

16:50 *Phase-field study of interfacial and elastic energy effects on microstructure evolution in Al alloys* – R. Chafle, A. Safi, E. Mathew, J. Herrnring, B. Klusemann

17:10 *Modeling of concrete corrosion, including corrosion products – electric current intensity relation* – K. Yurkova, T. Krykowski

17:30 *Overview on solid mechanics and digital computers* – A. Szekeres [Cancelled]

Room R5: S11-2 Particle-based methods in computational mechanics

16:10 *MercuryDPM: Fast, flexible, particle simulations* – A. Thornton, T. Weinhart – **Keynote**

16:50 *Numerical modelling of thermal properties of particulate lightweight composites* – D. Mačiūnas, R. Kačianauskas, J. Rojek, V. Antonovič, J. Malaiškienė, R. Stonys

17:10 *Numerical study of heat conduction of spark plasma sintered materials* – S. Nosewicz, G. Jurczak, T. Wejrzanowski, S. H. Ibrahim, A. Grabias, W. Węglewski, K. Kaszyca, J. Rojek, M. Chmielewski

17:30 *Determination of thermal conductivity of porous materials manufactured by FAST/SPS by DEM simulation* – J. Rojek, R. Kasztelan, T. Ramakrishnan, S. Nosewicz, K. Kaszyca, M. Chmielewski

17:50 *Performance of the thermal discrete element method implemented on shared-memory architectures* – A. Kačeniuskas, R. Pacevič, R. Kačianauskas, A. Džiugys

Room R6: S09-1 Nonlinear dynamics, vibrations and control

16:10 *Refined zig-zag theory for dynamic characteristics of laminate plates with viscoelastic layers* – P. Litewka, R. Lewandowski – **Keynote**

16:50 *Eigenvibration of plates with VE supports in terms of continuation and subspace iteration methods* – A. Lenartowicz, M. Przychodzki, M. Łasecka-Plura, M. Gumiński

17:10 *Rheological properties of viscoelastic material identified in shear tests and uniaxial tests* – Z. Pawłak

17:30 *Modal analysis of bar structures with semi-rigid and viscoelastic connections* – M. Łasecka-Plura, Z. Pawłak, M. Żak-Sawiak

17:50 *Resistance of auxetic sandwich plate to projectile penetration under different impact conditions* – J. Michalski, T. Stręk

List of posters

S02 Biomechanics and biomaterials

The impact of transverse connector in spinal fixation: the numerical and experimental analysis – K. Szkoda-Poliszuk, M. Żak, R. Załuski, C. Pezowicz

Modeling of the process of functional adaptation of the bone tissue around the implant – K. Jasiurkowska, J. Filipiak

Biomechanical analysis of the Chordae Tendineae structure of the dogs atrioventricular apparatus – A. Mackiewicz, J. Gach, I. Janus, T. Klekiel, A. Noszczyk-Nowak, R. Będziński

S03 Experimental mechanics

Damage accumulation modeling of EN AW 2024 T3 aluminium alloy at elevated temperature – A. Falkowska, A. Seweryn

Experimental investigations of aluminum mobile scaffolding – M. Pieńko, E. Błazik-Borowa, A. Ciebień

Analysis of mechanical behavior of micro specimen using micro DIC method and numerical simulations – G. Kokot, T. Rusin

Elastic wave application for damage detection in concrete slab with GFRP reinforcement – D. Ziaja, M. Jurek, A. Wiater

Analysis of cracking evolution and fracture energy change of steel fiber-reinforced concrete – I. Pokorska, M. Poński, W. Kubissa, T. Libura, A. Borecki, Z. Kowalewski

Experimental investigation of an indirect free cooling system including a dry cooler equipped with evaporative cooling pads for data center – M. Hnayno, A. Chehade, C. Maalouf, G. Polidori

S04 Geomechanics and granular materials

An effect of content and particle stiffness on the mechanics of particle mixtures: experimental and numerical study – J. Wiącek, M. Molenda, J. Horabik, M. Bańda, P. Parafinuik

Essence and usefulness of a new thermodynamic method for determining porosity of solid materials – Z. Żmudka, S. Postrzednik

Influence of undercutting anchor geometry on the extent of the rock failure zone during pull-out – A. Wójcik, J. Jonak, J. Podgórski

S05 Micromechanics of heterogeneous materials

Granular computing in computational homogenisation problems – W. Beluch, M. Hatłas, J. Ptaszny

Towards optimal space-fractional Euler-Bernoulli beam design – K. Szajek, P. Stempin, W. Sumelka

S06 Multiphysics problems

Electric field impact during modelling of thermoablation in multilayer breast model with tumor – M. Paruch

S07 Multi-scale modeling

Application of the interval lattice Boltzmann method in two-dimensional advection-diffusion problem – A. Piasecka-Belkhayat, A. Korczak

A numerical simulation of single and two-phase flow in porous media – H. Grzybowski, M. Doroszko

S09 Nonlinear dynamics, vibrations and control

Chaotic dynamics of size-dependent flexible rectangular in plan flat shells – V. Krysko-jr, J. Awrejcewicz

S12 Plasticity, damage and fracture mechanics

Blast loading on structure using Abaqus and deep neural network – T. Park, B. Ahmed, J. Jeon

Application of unified mechanics theory to constitutive modeling of gigacycle fatigue – H. Wei Lee, H. Fakhri, R. Ranade, H. Egner, A. Lipski, M. Piotrowski, S. Mroziński, N. B. Jamal, C. L. Rao

Dissipative phenomena accompanying low cycle fatigue of P91 steel – W. Egner, H. Egner, S. Mroziński, M. Piotrowski

A mechanically motivated damage model based on the theory of invariant tensor functions – C. Findeisen

Prediction of damage growth in EN-AW 2024 aluminum alloy under LCF regime – A. Tomczyk, A. Seweryn

Fracture in PMMA notched specimens under torsion – E. Bura, A. Seweryn

S15 Soft computing

Modeling of order book with ordered fuzzy numbers – A. Marszałek, T. Burczyński

Simulations of high frequency welding by using integrated electromagnetic and thermal models for metamodels design and implementation – M. Pernach, Ł. Rauch, K. Bzowski, K. Regulski, B. Pawłowski, D. Tyrała

Application of Finite Element Method based simulations for prediction of liquid steel cooling rate in main ladle for purposes of Cyber-Physical Systems – M. Pernach, Ł. Rauch, M. Piwowarczyk, K. Bzowski, K. Regulski, P. Hajder, A. Opaliński

S16 Structural optimization and optimum material design

Modeling the mechanical properties of microalloyed steels containing Nb and V elements – P. Marynowski, M. Hojny, B. Mrzygłód, I. Olejarczyk-Woźeńska, T. Dębiński

Self-adaptive population Rao algorithm for optimization steel grillage structures – M. Grzywiński, T. Dede, B. Atmaca

S17 Computational and experimental advanced mechanics in engineering applications

Numerical analysis of cold-formed sigma-type steel beams reinforced with CFRP wraps and tapes – K. Rzeszut, M. Dybizbański, I. Szewczak, P. Różyło

Influence analysis of environmental conditions on the surface layer of the rolling-sliding contact – A. John, H. Bąkowski

Numerical and experimental research on wooden joins with steel plate fasteners – K. Kula, A. Denisiewicz, T. Socha

The dual-phase La₂Zr₂O₇ + 8YSZ atmospheric plasma sprayed thermal barrier coatings: determination of thermal conductivity and thermal stress distribution – A. Jasik

FEM simulation and optimization of fine-blanking process for aluminum alloy sheet – Ł. Bohdal, L. Kukiełka, R. Patyk, M. Miksza, K. Kośka

Tuesday, September 6, 2022

08:30 – 10:10

Plenary session P3

08:30 Dennis M. Kochmann

Microstructure of ferroelectric ceramics: simulation meets experiment

09:20 Jacek Tejchman

Application of a coupled DEM–CFD approach to engineering problems

10:10 – 10:40

Coffee break

10:40 – 12:40

Parallel sessions

12:40 – 14:00

Lunch

14:00 – 16:00

Parallel sessions

16:00 – 16:30

Coffee break

16:30 – 18:30

Parallel sessions

19:00 – 20:00

**General Assembly of the
Polish Association for Computational Mechanics**

Room R1: S05-3 Micromechanics of heterogeneous materials

- 10:40 *On microstructural length scales in metallic materials* – H. Petryk – **Keynote**
- 11:20 *Twinning as a displacive transformation: a coupled phase-field and crystal plasticity model* – M. Rezaee Hajidehi, P. Sadowski, S. Stupkiewicz
- 11:40 *Modelling of plastic deformation of metal crystals by a quasi-extremal energy principle* – M. Kursa, H. Petryk
- 12:00 *Shear band formation in porous thin-walled tubes subjected to dynamic torsion* – A. Vishnu, J. C. Nieto-Fuentes, J. A. Rodríguez-Martínez
- 12:20 *Investigating the effect of grain orientations on the development of near boundary gradient zone* – N. Pai, I. Samajdar, A. Patra

Room R2: S17-3 Computational and experimental advanced mechanics in engineering applications

- 10:40 *Probabilistic divergence application in structural reliability analysis* – M. Kamiński
- 11:00 *Discrete Wavelet Transform application for detecting damage in bars and nodes of truss structures* – A. Knitter-Piątkowska, O. Kawa
- 11:20 *Identification of elastic material parameters based on digital image correlation results* – M. Nowak, P. Szeptyński, M. Maj
- 11:40 *Experimental determination and numerical simulation of 3D printed 316L steel by FDM* – R. Roszak, M. Ziegenhorn, D. Schob, H. Sparr
- 12:00 *Saturated poroelastic half-space problem with axisymmetric cylindrical indenter* – K. Miura, M. Sakamoto
- 12:20 *Neural decision-making system of the mining sorter, activating the appropriate number of sorting nozzles* – M. Dudzik, J. Progorowicz

Room R3: S12-2 Plasticity, damage and fracture mechanics

- 10:40 *Unified brittle failure criteria* – Y. Kwon – **Keynote**
- 11:20 *Anti-plane bridge cracks interaction in piezoelectric materials with initial fields* – E. Craciun, G. Ghita
- 11:40 *Modeling of deformation and fracture of metal-ceramic microcantilever beams in bending* – W. Węglewski, P. Pitchai, K. Bochenek, M. Basista
- 12:00 *A domain-decomposition MD-FE coupling method for fracture simulations of amorphous polymers* – W. Zhao, P. Steinmann, S. Pfäller
- 12:20 *Fracture simulations of ice with the phase field method* – R. Sondershaus, R. Müller

Room R4: S01-1 Advanced discretization methods

- 10:40 *Adaptive local surface refinement for isogeometric contact, fracture and topology optimization* – R. A. Sauer – **Keynote**
- 11:20 *An isogeometric frictionless contact formulation of Cosserat rods with unconstrained directors* – M. Choi, S. Klinkel, R. A. Sauer
- 11:40 *Software architectural issues in building IGA-based flexible simulation environment in C++* – A. Perduta, R. Putanowicz
- 12:00 *An isogeometric mortar method with optimal convergence and reduced support* – W. Dornisch, J. Stöckler
- 12:20 *Parallel computations with the simplex-shaped space-time finite element method in structural dynamic* – C. Bajer, B. Dyniewicz, M. Bajkowski

Room R5: S13-1 Shells and plates

- 10:40 *Vibrations of an orthotropic plate with point supports subjected to a moving force* – F. Zakeś
- 11:00 *Initial stability analysis of thin plates in terms of the Finite Difference Method* – A. Lenartowicz, M. Gumińskiak, M. Przychodzki
- 11:20 *Numerical homogenization of multilayer walls of tanks for biomaterials* – N. Staszak, T. Garbowski
- 11:40 *Implementation of visco-hyperelastic constitutive model for shell elements* – T. Wiczenbach, Ł. Pachocki, W. Witkowski, R. Wolny
- 12:00 *Numerical modeling of delamination in multi-layered plates with large deformation description* – J. Jaśkowiec, P. Pluciński

Room R6: S09-2 Nonlinear dynamics, vibrations and control

- 10:40 *Semi-active mitigation of free and forced vibrations by means of truss-frame nodes* – Ł. Jankowski, B. Popławski, M. Ostrowski, A. Jedlińska, G. Mikułowski, B. Błachowski, D. Pisarski, R. Wiszowaty, A. Mróz, A. Orłowska, J. Hou, J. Holnicki-Szulc
- 11:00 *A study on effectiveness of macro fiber composite actuator in vibration reduction of composite beam* – A. Raza, R. Rimašauskienė, S. Mahato
- 11:20 *Optimization of MTMD parameters based on the H2 and Hinfin norm on the example of a tall building* – P. Wielgos
- 11:40 *Steady vibration problems in the theory of elasticity for materials with triple voids* – M. Svanadze
- 12:00 *Two coupled bodies reflection by dry friction on a horizontal plane* – A. Prokopenya

Room R1: S05-4 Micromechanics of heterogeneous materials

- 14:00 *Mechanisms of strengthening biogenic structures uncovered in shells of mollusks* – K. Nalepka, K. Berent, A. Checa, T. Machniewicz, P. Czaja, M. Bieda, Ł. Maj, K. Sztwiertnia
- 14:20 *Modelling of plastic strain-induced martensitic transformation in austenitic stainless steels using incremental mean-field homogenization schemes* – P. Fernandez-Pison, J. A. Rodriguez-Martinez, S. Sgobba
- 14:40 *Microstructure and modeling of austenitic stainless steels during fracture at cryogenic temperatures* – E. Schmidt, B. Skoczeń, K. Nalepka
- 15:00 *Experimental and multiscale characterization of elastic viscoplastic copper under cyclic loading* – G. Girard, K. Frydrych, K. Kowalczyk-Gajewska, M. Martiny, S. Mercier
- 15:20 *Spurious softening predicted by the Mori-Tanaka scheme for elastic-viscoplastic composites* – P. Sadowski, K. Kowalczyk-Gajewska, S. Stupkiewicz
- 15:40 *Effect of twinning on void growth and the lattice orientation heterogeneity in HCP single crystals* – S. Virupakshi, K. Frydrych, K. Kowalczyk-Gajewska

Room R2: S17-4 Computational and experimental advanced mechanics in engineering applications

- 14:00 *Metamodel of the laser heating process in rotary forming processes* – B. Mrzygłód, I. Olejarczyk-Woźeńska, M. Hojny, T. Dębiński, P. Marynowski
- 14:20 *Geometric modelling of rotary forming in virtual reality environment* – T. Dębiński, M. Hojny, P. Marynowski, B. Mrzygłód, I. Olejarczyk-Woźeńska
- 14:40 *Numerical modelling of rotary forming with laser heating supported by multi-GPU acceleration* – M. Hojny, P. Marynowski, T. Dębiński, B. Mrzygłód, I. Olejarczyk-Woźeńska, T. Gądek
- 15:00 *Wave absorbing boundaries in dynamic analyses of wind turbines* – M. Steggewentz, O. Beilke, M. Stahl
- 15:20 *Identification of the self-stress states of tensegrity domes using a genetic algorithm* – M. Solovei, P. Obara
- 15:40 *Dynamic contact analysis of a rotating annulus using reduced order system approach* – G. Akilesh, M. Pandey

Room R3: S12-3 Plasticity, damage and fracture mechanics

- 14:00 *A continuum damage mechanics model for static and fatigue degradation of fiber reinforced polymers* – Z. M. A. Hamid, C. Findeisen, D. Laveuve, D. Spancken, J. Hohe – **Keynote**
- 14:40 *Simulations of different failure mechanisms in reinforced concrete beams with isotropic damage laws* – J. Bobiński, J. Schönnagel, P. Chodkowski
- 15:00 *Assessment of fracture parameters in simulations of concrete cracking at mesoscale level* – B. Kondys, J. Bobiński, I. Marzec
- 15:20 *Experiments and FEA modelling of cracking in steel fibre reinforced high-performance concrete* – I. Marzec, J. Suchorzewski, J. Bobiński

15:40 *Viscoplastic consistency model for concrete with non-associated flow rule* – A. Winnicki,
A. Wosatko

Room R4: S01-2 Advanced discretization methods

- 14:00 *An hp-adaptive discontinuous Petrov-Galerkin finite element method for compressible viscous flows* – W. Rachowicz, W. Cecot
- 14:20 *A FEM for computing displacement and pressure independently in linear incompressible elasticity* – A. Zdunek, W. Rachowicz, M. Neunteufel
- 14:40 *A mixed polygonal Finite Element formulation for nearly-incompressible hyperelastic materials* – B. Sauren, S. Klinkel
- 15:00 *Modelling of thin metal film heating using the DPL equation with temperature-dependent parameters* – E. Majchrzak, B. Mochnacki
- 15:20 *Application of residual methods of error estimation to coupled problems of piezoelectricity* – G. Zboiński
- 15:40 *The multiscale finite element method for sandwich beams and plates* – M. Dryzek,
W. Cecot

Room R5: S13-2 Shells and plates

- 14:00 *On virtual elements for Kirchhoff-Love plates and shells* – P. Wriggers, B. Hudobivnik
– **Keynote**
- 14:40 *Geometric finite elements for director shell models* – O. Sander
- 15:00 *Stress-based finite element solution of the Mindlin plate bending problem* – Z. Więckowski, P. Świątkiewicz
- 15:20 *Wrinkling stress of sandwich panels with non-homogeneous core* – Z. Pozorski,
J. Pozorska
- 15:40 *Analysis of FGM plates based on neutral surface and general third-order plate theory* – M. Taczała, R. Buczkowski, M. Kleiber

Room R6: S09-3 Nonlinear dynamics, vibrations and control

- 14:00 *Stochastic vibrations of plates with viscoelastic dampers* – M. Kamiński, A. Lenartowicz,
M. Gumiński, M. Przychodzki
- 14:20 *Identification of dynamic characteristics of uncertain bolted connections in a frame structure* – M. Ostrowski, B. Błachowski, G. Mikułowski, Ł. Jankowski
- 14:40 *Multimodal stochastic interactions in a cable-mass-host structure system under seismic excitation* – H. Weber, S. Kaczmarczyk, R. Iwankiewicz
- 15:00 *Dynamic response of a guy line of a guyed tower to stochastic wind excitation* – A. Jabłonka, H. Weber, R. Iwankiewicz
- 15:20 *Solution for a random response of a nonlinear “beam inside beam” model by using a hybrid approach based on a semi-analytical wavelet approximation* – P. Koziol
- 15:40 *Dynamic response of structure containing viscoelastic elements with uncertain parameters* – M. Łasecka-Plura

Room R1: S05-5 Micromechanics of heterogeneous materials

- 16:30 *FFT simulation of void growth and coalescence* – K. Frydrych
- 16:50 *Microstructural modeling of anisotropic and tension-compression asymmetric ductile metals* – S. Hashem, N. Hosseini, G. Vadillo
- 17:10 *Elastic disk with isoperimetric Cosserat coating* – M. Gaibotti, D. Bigoni, S. G. Mogilevskaya
- 17:30 *Space-fractional Kirchhoff-Love plate theory for bending analysis with scale effect* – P. Stempin, W. Sumelka
- 17:50 *Fractional calculus in material instability for non-local solids* – P. Beda
- 18:10 *Stress-strain behaviour of metal cellular materials using artificial neural networks* – A. Stręk, M. Dudzik, T. Machniewicz

Room R2: S17-5 Computational and experimental advanced mechanics in engineering applications

- 16:30 *Mechanical response of pre-buckled honeycomb structures manufactured additively* – M. Sarzyński, P. Płatek, P. Baranowski, I. Czernichowski
- 16:50 *Combined experimental and analytical approach to determine limit load of a slender reinforced concrete column in operational conditions* – M. Drozdowska, A. Tomaszewska, M. Sondej
- 17:10 *Seismic analysis of scaffolding* – J. Bęc
- 17:30 *Finite element analysis of a lower limb prosthesis made with the use of auxetic metamaterials* – A. Mrozek, T. Stręk
- 17:50 *Numerical modeling of compressed glulam joints with irregular shape of contact* – G. Sroka, A. Al Sabouni-Zawadzka, J. Pełczyński, W. Gilewski
- 18:10 *Optimisation of a composite wood-concrete girder with fibre-composite reinforcement* – T. Socha, A. Denisiewicz, K. Kula

Room R3: S12-4 Plasticity, damage and fracture mechanics

- 16:30 *Theory of yield strength in body-centered-cubic High Entropy Alloys* – F. Maresca, W. Curtin
- 16:50 *Analytical-numerical stability analysis for large strain thermo-mechanical problems* – B. Wcisło, J. Pamin, K. Kowalczyk-Gajewska, A. Menzel
- 17:10 *Plastic flow instability in austenitic stainless steels at wide range of temperatures (4K – 293K)* – J. Tabin, K. Nalepka, J. Kawałko, A. Brodecki
- 17:30 *Double surface model of the intermittent plastic flow in ductile materials at cryogenic temperatures* – R. Schmidt, B. Skoczeń

17:50 *Localized necking in thin sheets subjected to proportional and non-proportional loading* – R. Sidharth, S. Keralavarma

Room R4: S01-3 Advanced discretization methods

16:30 *Solution algorithms of the multipoint meshless FDM for the multiscale and nonlinear analysis* – I. Jaworska

16:50 *Coupling FEM with FD meshless method by means of approximation constraints* – J. Jaśkowiec, S. Milewski

17:10 *Automatic generation of internal points and cells in the fast multipole boundary element method* – B. Ciszyńska, J. Ptaszny

17:30 *Virtual Element Method in 2D elasticity problem in contact mechanics* – P. Goliszewski

17:50 *Numerical analysis of a non-clamped dynamic thermoviscoelastic contact problem* – K. Bartosz, P. Szafraniec, M. Jureczka, P. Bartman

Room R5: S13-3 Shells and plates

16:30 *Evaluation of composite auxetic annular plate under lateral load* – D. Pawlus

16:50 *Analytical study of thermo-mechanically loaded FGM-steel/aluminum hollow spherical structures* – E. Arslan, W. Mack, T. Apatay

17:10 *Determination of the torsional stiffness of sandwich panels by means of full-scale laboratory tests* – S. Wojciechowski, Z. Pozorski

17:30 *Validation of the continuum model of tensegrity beam- and plate-like structures* – J. Tomasiak, P. Obara

17:50 *On the mathematical model of circular/annular plates resting on Winkler foundation* – M. Mofid, M. A. Foyouzat

Room R6: S16-1 Structural optimization and optimum material design

16:30 *Geometry optimization of trusses by Force Density Method* – G. Dzierżanowski – Keynote

17:10 *Optimal design of archgrids: Finite element approach* – R. Czubacki

17:30 *The isotropic material design of the elasto-plastic structures* – S. Czarnecki, T. Lewiński

17:50 *Topological sensitivity of higher order homogenized tensors in periodic elasticity and applications* – V. Calisti, A. Lebée, A. A. Novotny, J. Sokolowski

18:10 *Phase field topology optimization of elasto-plasticity with frictional contact* – A. Myśliński

Notes

Wednesday, September 7, 2022

08:30 – 10:10

Plenary session P4

08:30 Matthew Gilbert

Application of layout optimization methods in engineering analysis and design

09:20 Dariusz Łydżba

Overall microstructure response function and its application to recovery of microstructure

10:10 – 10:40

Coffee break

10:40 – 12:40

Parallel sessions

12:40 – 14:00

Lunch

14:00 – 16:00

Parallel sessions

16:00 – 16:30

Coffee break

16:30 – 17:20

Plenary session P5

16:30 Tarek Zohdi

Modeling and simulation tools for industrial and societal research applications: digital twins and genome-based machine-learning

20:00 – 23:00

Conference Dinner & Closing Ceremony

Room R1: S07-1 Multi-scale modelling

- 10:40 *Using different solvers for FFT-based microstructure simulations with a reduced set of Fourier modes* – C. Gierden, J. Waimann, B. Svendsen, S. Reese
- 11:00 *Investigation of influence of Ti64 lattice defects on mechanical properties using image-based FEA* – M. Doroszko, A. Seweryn
- 11:20 *Concentration and influence tensor fields in micromechanical systems, derived from Green's functions* – N. Jimenez Segura, B. L. A. Pichler, C. Hellmich
- 11:40 *Development of efficient algorithmic solutions dedicated to random cellular automata models* – M. Czarnecki, M. Sitko, K. Pawlikowski, Ł. Madej
- 12:00 *Development of the grain growth model based on the random cellular automata method* – K. Pawlikowski, M. Czarnecki, M. Sitko, Ł. Madej
- 12:20 *Stability and accuracy in dynamic-transient multiscale schemes for wave propagation* – S. Raorane, T. Uhl, P. Paćko

Room R2: S02-1 Biomechanics and biomaterials

- 10:40 *Design and experimental verification of the stents for the treatment of urethral stenosis* – T. Klekiel, A. Mackiewicz, J. Kurowiak, T. Piasecki, A. Noszczyk-Nowak, R. Będziński – **Keynote**
- 11:20 *Cervical spine injuries during car collisions with road safety barriers - finite element study* – Ł. Pachocki, D. Bruski, T. Wiczenbach, K. Wilde, R. Wolny
- 11:40 *The influence of test conditions on identified parameters of the constitutive model of the knitted abdominal prosthesis* – D. Reznikov, A. Tomaszewska
- 12:00 *Finite element- and meta-modelling of abdominal wall with an implanted hernia mesh* – K. Szepietowska, I. Lubowiecka
- 12:20 *Bioresorbable stents: design, simulation and experiment case study* – N. Molęda, G. Kokot, W. Kuś

Room R3: S04-1 Geomechanics and granular materials

- 10:40 *Viscoelastic damage model for rate-dependent shear behavior of shales* – M. Gutierrez – **Keynote**
- 11:20 *Numerical analyses of hydraulic fracture growth in a 3D rock specimen due to high pressure water* – R. Abdi, M. Krzaczek, J. Tejchman
- 11:40 *A quadratic constitutive law for viscous creep of isotropic ice inferred from experiments* – R. Staroszczyk, L. W. Morland
- 12:00 *Numerical modeling and improvement of underground blasting efficiency* – M. Kucewicz, P. Baranowski, Ł. Mazurkiewicz, J. Małachowski

Room R4: S15-1 Soft computing

- 10:40 *Differential evolution and elements of game theory for multi-objective optimization in mechanics* – A. Długosz, T. Schlieter – **Keynote**
- 11:20 *Comparison of various improvements for evolutionary algorithm applied to large optimization problems* – M. Główacki, J. Orkisz
- 11:40 *Identification of non-linear bolted joint stiffness using tightening characteristic* – G. Dziatkiewicz, R. Popiel
- 12:00 *Shape optimization of the muffler shield with regard to strength properties* – J. Jarosz, A. Długosz
- 12:20 *Solving design optimization problems using machine learning and automatic differentiation* – M. Stoński

Room R5: S08-1 Nanomaterials and nanocomposites, their properties and applications

- 10:40 *Specific properties of nanomaterials and their potential in technical applications* – M. Giersig – **Keynote**
- 11:20 *Design of nanostructures based on molybdenum* – T. Burczyński, W. Kuś, M. Maździarz, A. Mrozek
- 11:40 *Critical thickness evolution during the subsequent epitaxial layers growth* – P. Dłużewski
- 12:00 *A new concept of epoxy resin composite doped with carbon-based nanoparticles: manufacturing, experiment and modeling* – S. Wilczewski, Z. Nowak, R. Pęcherski, M. Giersig
- 12:20 *Development of constitutive relations of viscoplasticity accounting for shear banding* – R. Pęcherski, Z. Nowak

Room R6: S16-2 Structural optimization and optimum material design

- 10:40 *The new paradigm for lightweight design – biomimetic approach to compliance minimization* – M. Nowak, K. Szulc, J. Sokołowski
- 11:00 *Advanced evolutionary procedures of design for additive manufacturing* – M. Mrzygłód, G. Fiuk
- 11:20 *An efficient method for topology optimization with prescribed safety margin* – P. Tauzowski, B. Błachowski, J. Lógó
- 11:40 *Structural topology optimization of a modular snake-like manipulator* – E. Zawidzka, P. Tauzowski, M. Zawidzki, B. Błachowski, Ł. Jankowski
- 12:00 *Modelling of auxetic phase composite materials with optimized properties by fast multipole BEM* – J. Ptaszny
- 12:20 *Multi-objective optimization of patient-specific artificial heart valves* – L. Patys, M. Mrzygłód

Room R1: S07-2 Multi-scale modelling

- 14:00 *Current advancements and challenges in multiscale domain-decomposition simulations of polymers* – S. Pfaller, C. Bauer, M. Ries, W. Zhao
- 14:20 *A micromechanically motivated multiscale approach to model laser powder bed fusion processes* – I. Noll, T. Bartel, A. Menzel
- 14:40 *Microstructure evolution analysis under thermal loading based on discrete modelling method* – M. Wermiński, K. Perzyński, M. Zarnik, M. Sitko, Ł. Madej
- 15:00 *Numerical investigation of stirring energy for various equipment in the metallurgical industry* – M. Zielińska, H. Yang, Ł. Malinowski, Ł. Madej
- 15:20 *Numerical modelling of single point incremental forming based on 3D printed dies* – K. Perzyński, K. Muszka, M. Paćko, Ł. Madej
- 15:40 *Modeling the deformation and damage behavior of TRIP Steel and Zirconia particle composites* – F. Qayyum, M. Kirchner, S. Tseng, S. Guk, U. Prahlf

Room R2: S02-2 Biomechanics and biomaterials

- 14:00 *Analysis of crystallization degree during cryopreservation applying interval arithmetic* – A. Piasecka-Belkhayat, A. Skorupa
- 14:20 *Comparative analysis of slow freezing and vitrification methods using interval arithmetic* – A. Piasecka-Belkhayat, A. Skorupa
- 14:40 *Numerical modeling of laser induced high-temperature hyperthermia using the dual-phase lag equation* – M. Stryczyński, E. Majchrzak
- 15:00 *Modeling of photochemical and photothermal effects in soft tissue subjected to laser irradiation* – M. Jasiński, M. Zadoń
- 15:20 *Modeling of the influence of elevated temperature on oxygen distribution in soft tissue* – M. Jasiński, M. Zadoń
- 15:40 *Influence of 3D printing on the geometrical and mechanical properties of mesh* – O. Promirska, M. Żak, C. Pezowicz

Room R3: S04-2 Geomechanics and granular materials

- 14:00 *On the anisotropy and hydromechanical properties of intact/jointed rocks* – S. Pietruszczak – **Keynote**
- 14:40 *On a control of contact interaction in the analysis of friction and wear* – Z. Mróz, I. Paczelt
- 15:00 *Numerical modelling of concrete-to-concrete interfaces for slim-floor composite slabs analysis* – S. Dudziak, P. M. Lewiński
- 15:20 *Computational method of predicting the crack propagation in confrontation with the laboratory tests* – J. Gontarz, J. Podgórski

Room R4: S15-2 Soft computing

- 14:00 *Identification of thermophysical parameters using an artificial immune system* – A. Poteralski, J. Dziatkiewicz
- 14:20 *Convolutional neural networks in the SSI analysis for mine-induced vibrations* – M. Zajac, K. Kuźniar
- 14:40 *Anomaly detection in screw connections based on guided waves and neural networks* – P. Nazarko, L. Ziemiański, D. Ziaja
- 15:00 *Meshless methods and a metaheuristic for elastoplastic properties of rods identification* – J. Grabski, A. Mrozek, M. Sopa
- 15:20 *Neural modeling in practical metric age assessment of children and adolescents* – M. Zaborowicz, K. Zaborowicz, B. Biedziak, T. Garbowski
- 15:40 *Deep learning-based analysis and optimization of thin-walled composite shells* – B. Miller, L. Ziemiański

Room R5: S14-1 Smart materials and structures

- 14:00 *Modular robots as distributed computers of their own mechanical state* – B. Piranda, P. Chodkiewicz, P. Hołobut, S. Bordas, J. Bourgeois, J. Lengiewicz – **Keynote**
- 14:40 *Ti-Beta alloy - gum metal and TiNi shape memory alloy subjected to compression loading in wide range of the strain rates* – E. Pieczyska, K. Golasiński, M. Staszczak, J. Janiszewski, J. Sienkiewicz, K. Takeda
- 15:00 *Masonry walls strengthened with Shape Memory Alloy and engineered cementitious composite* – A. Tabrizikahou, M. Kuczma, M. Lasecka-Plura, E. Noroozinejad Farsangi
- 15:20 *Electro-magneto-elastic fields of general line source in piezoelectric-piezomagnetic strip* – R. Kotowski, V. I. Alshits, A. Drabik, J. P. Nowacki
- 15:40 *Thermal stresses in periodic cellular auxetic structures* – T. Strek

Room R6: S16-3 Structural optimization and optimum material design

- 14:00 *Optimal design of plane elastic membranes and application to 3D form-finding* – K. Bołbotowski – **Keynote**
- 14:40 *Recovery of microstructures appearing in the least compliant 2D non-homogeneous elastic bodies* – T. Łukasiak, S. Czarnecki
- 15:00 *Application of radial basis functions in level-set method for structural topology optimization* – P. Sobczak, T. Sokół
- 15:20 *The novel efficient heuristic structural topology generators for engineering applications* – K. Tajs-Zielińska, J. Miodowska, B. Bochenek
- 15:40 *Optimization strategy for the inverse analysis of material stochastic model identification* – D. Szeliga, N. Czyżewska, K. Klimczak, J. Kusika, P. Morkisz, P. Oprocha, M. Pietrzyk, P. Przybyłowicz

Notes

Thursday, September 8, 2022

10:00 – 12:00

Excursion – Świnoujście harbour cruise

12:40 – 14:00

Lunch

The end

Notes