- CIVIL-COMP 2023:
  The Seventeenth International Conference on
  Civil, Structural and Environmental Engineering Computing,
  September 2023
  28-31 August 2023
  Pécs, Hungary
- CIVIL-COMP-OPTI 2023:
  The Sixth International Conference on
  Soft Computing, Machine Learning and Optimization in Civil, Structural and Environmental Engineering,
  28-31 August 2023
  Pécs, Hungary
- PARENG 2023:
  The Seventh International Conference on
  Parallel, Distributed, GPU and Cloud Computing for Engineering,
  28-31 August 2023
  Pécs, Hungary

FINAL CONFERENCE PROGRAMME

OPENING PLENARY SESSION
Monday 28th August 2023: 16.30 in Room: 007

Chairmen: Professor Peter Ivanyi and Professor Barry Topping

"Advances in Computational Constitutive Modeling"
Professor Francisco J. Montáns
Professor of Continuum and Structural Mechanics, Universidad Politécnica de Madrid, Spain
Honorary Professor of Mechanical and Aerospace Engineering, University of Florida, USA

Followed by a Reception in the Atrium

The Conference Venue is the Faculty of Engineering and Information Technology, University of Pécs, Pécs, Hungary

The address of the Faculty is: University of Pecs, Faculty of Engineering and Information Technology 7624, Boszorkány 2, Pécs, Hungary. (https://what3words.com/quack.beans.lentil)

Notes:

- Authors: Please meet your session chair at least 15 minutes before the session starts. Please upload your presentation from your data USB stick to the PC provided in the room. Participants may use their own laptops provided that they have an HDMI output or a converter for HDMI output. (No VGA!)
- Presentations Times: All presentations times are 15 minutes (12 minutes presentation, 3 minutes questions) unless other times are given in the programme.
- Coffee Breaks are: Tuesday, Wednesday Thursday 10.30-11.00 and Tuesday, Wednesday 15.30-16.00
- Lunches are between 12.30 and 14.00 last service is at 13.15.
- The pdfs of the papers can be found by selecting the appropriate volume from the webpage: https://www.ctresources.info/ccc/
- Registration Desk opens at 2.30 on Monday 28th August in the Atrium on the Ground Floor of the Faculty Building.

Tuesday 29th August 2023: Room 007	Tuesday 29th August 2023: Room 008	Tuesday 29th August 2023: Room 019
9.15-10.15 **Civil-Comp 2023: Session 3** **Underground Structures in Liquefiable Ground** Chaired and organisation by: Prof. Y. Yuan, Prof. R. Cudmani and Dr. J. Zhang 3.1 Seismic Analysis of Twin Tunnels Situated in Liquefiable Grounds using the Domain Reduction Method Z.X. Fan, Y. Yuan and Y.S. Yang 3.2 Numerical Prediction of Centrifuge Test for Liquefiable Sand Subjected to Strong Earthquake K.R. Huang and Y. Yuan 3.3 A Small-Strain Damping Model for Gravelly Soils subjected to Different Excitation Frequencies Q.Z. Sang, X. Chen and Y. Yuan 3.4 Preliminary Numerical Simulation of Shaking Table Test on Shaft-Tunnel Junction in Liquefiable Soil M. Sun and J. Zhang	**9.00-10.30** **Civil-Comp Opti 2023: Session 1** **Structural Optimization Modeling and Simulation** Chaired and organisation by: Dr M.M. Rad, Prof. R. Cucuzza, Prof. M. Domaneschi, Prof. G.C. Marano and Prof A.M.B. Martins 1.1 Multi-Objective Shape Optimization of Multi-Axis Wave Energy Converter A. Shadmani, M.R. Nikoo and A.H. Gandomi 1.2 A Tractable Robust Topology Optimization for Anomalous Non-Symmetric Cases A. Csébfalvi and J. Lógó 1.3 Computational framework for a family of methods for stress-constrained topology optimization J. Lógó, P. Tauzowski and B. Blachowski 1.4 Optimisation of Pre-cast Slab Systems for Large Span Floors and Roofs B. Raphael 1.5 Construction-based optimization criteria for steel trusses R. Cucuzza, M. Domaneschi, J.C.O. Garcia, M.M. Rad and M. Habashneh 1.6 Enhancing thermal topology optimization with an elasto-plastic algorithm M.M. Rad, M. Habashneh, R. Cucuzza, M. Domaneschi and J. Melchiorre	**9.30-10.30** **PARENG 2023: Sessions 1 & 2** **PARENG 2023: Session 1** **Asynchronous iterative methods,** Chaired by: Prof. M. Yilmaz and Dr G. Gbikpi-Benissan Organised by: Prof. F. Magoulès 1.1 Accurate Coarse Residual for Two-Level Asynchronous Domain Decomposition Methods G. Gbikpi-Benissan and F. Magoules 1.2 Enhancing the Global/Local Coupling Method: An Asynchronous Parallel Framework A. El Kerim, P. Gosselet and F. Magoules **PARENG 2023: Session 2** **Domain Decomposition Algorithms** Chaired by: Prof. M. Yilmaz and Dr G. Gbikpi-Benissan 2.1 Automated Persistence of Subdomain Calculations in Finite Element Domain Decomposition I. Kucuk and M. Yilmaz 2.2 Schwarz domain decomposition algorithms to solve radiative transfer equation E. Strakova and T. Brzobohaty

Tuesday 29th August: Room 007	Tuesday 29th August: Room 008	Tuesday 29th August: Room 019
11.00-12.45: **Civil-Comp 2023: Session 9** **Computational Modeling in Biomechanics and Bioengineering** Chaired and organisation by: Dr J.M. Benitez, Dr J. Ayensa, Dr M. Latorre and Professor F.J Montans 9.1 On failure of ceramic restorative crowns under mastication loads, M. Ashrafi and M. Doblare 9.2 A simple agent-based hybrid model to reproduce the individual and collective migration of glioblastoma multiforme cells, L. Saucedo-Mora, M.A. Sanz, F.J. Montáns and J.M. Benítez 9.3 A Mechanobiologically Equilibrated Kinematic Growth Model for Soft Tissues, A. Bezmalinovic, C. Garcia-Herrera, D. Celentano and M. Latorre 9.4 Effects of bone remodelling process on evaluating biomechanical stability of implant-supported bridges, I. Kang, Y. Yoon, S. Park, Y.-D. Kwon and G. Noh 9.5 Bifurcation of compressible elastic cylinders under internal pressure and axial loading, S. Parikh and M. Latorre 9.6 A 3D agent-based model to reproduce tumor-induced angiogenesis in glioblastoma multiforme, L. Saucedo-Mora, M.A. Sanz, F.J. Montáns and J.M. Benítez 9.7 Segmentation of the blastocyst structures using Image Processing and Machine Learning tools, M. Villota, J. Ayensa-Jiménez, M. Doblaré and J. Heras	**11.00-12.30:** **Civil-Comp Opti 2023: Session 1 (continued)** **Structural Optimization Modeling and Simulation (Continued)** **C**haired and organised by: Dr M.M. Rad, Prof. R. Cucuzza, Prof. M. Domaneschi, Prof. G.C. Marano and Prof A.M.B. Martins 1.7 Optimizing Transportation Plans of Designated Radioactive Waste Using Quantum Annealing N. Yabuki, J. Makino and T. Fukuda 1.8 On design-dependent loads in a NURBS-density-based topology optimisation method E. Urso, S. Zerrouq and M. Montemurro 1.9 Optimization of bowstring tied-arch concrete bridges A.M.B. Martins, L.M.C. Simoes and J.H.J.O. Negrao 1.10 A surrogate model based on NURBS entities for engineering problems B. Vuillod, M. Zani, L. Hallo, E. Panettieri and M. Montemurro 1.11 SCF Prediction using the Finite Element Method Coupled with Sobol Sampling and Bayesian Optimization A. Mohammed, S. R. Dasari and Y. M. Desai 1.12 On Filtering Techniques for Topology Optimisation based on B-Spline Entities S. Zerrouq and M. Montemurro	**11.00-12.45:** **Civil-Comp 2023: Session 10** **Buckling, Free Vibration and Response of Continuous Systems** Chairmen: Professor R. Banerjee and Prof. G. Turkalj organised by Professor R. Banerjee 10.1 A beam model for the buckling analysis of functionally graded open-section beams under thermal loads S. Kvaternik Simonetti, D. Lanc, G. Turkalj and D. Banic 10.2 Free vibration of cracked beams using the dynamic stiffness method and Timoshenko-Ehrenfest beam theory H. Su and J.R. Banerjee 10.3 Shear deformable beam model for buckling analysis of laminated beam-type structures G. Turkalj, D. Banic, D. Lanc and S. Kvaternik Simonetti 10.4 An exact stiffness matrix for buckling analysis of an axial-flexural coupled column including shear deformation J.R. Banerjee **Civil-Comp 2023: Session 11** **Structural Analysis, Design and Monitoring** Chairs: Prof. G. Turkalj and Prof J.R. Banerjee 11.1 Rigid Foldable Modular Origami Structure with Negative Poisson's Ratio and Negative Stiffness C. Chen, Y.T. Bai, S.H. Wang and Z.Y. Wang 11.3 A Comparative Investigation of Self- Repairing Concrete Incorporating Penetron Admix with Ordinary Concrete R.K. Shetiya, S. Elhadad, Z. Orban, A. Dormany, A. Fulop and A. Len 11.4 Braced grid framework rigidity characterization J. Katona and Gy. Nagy Kem

Tuesday 29th August: Room 007	Tuesday 29th August: Room 008	Tuesday 29th August: Room 019
14.00-15.30: **Civil-Comp: Session 2** **Vehicle Scanning Method for Bridges** Chaired and organised by: Prof. Y.B. Yang, Prof. J.D. Yau, Prof. J.P. Yang, Dr. Z.L. Wang, Dr. S. Urushdaze and Dr. D.S. Yang 2.1 Residual Contact Response Generated by Two Consecutive Moving Wheels for Bridge Detection, Y. B. Yang X.Q. Mo, K. Shi, H. Xu, Z.L. Wang and D.S. Yang 2.2 VSM-based modal detection for a tied-arch railway bridge beam using a passing vehicle, J.D. Yau and S. Urushadze 2.3 Moving Force Identification based on Dictionary Learning Z.-H. Zhang, W.-Y. He and W.-X. Ren 2.4 Pitching Effect in an Amplifier Enhanced Vehicle Model for Vehicle Scanning Method, J.P. Yang and C.C. Wang 2.5 Experiences from Analysis and Experiment Considering the Vehicle Scanning Method, J. Bayer and S. Urushadze 2.6 Retrieving Bridge Surface Roughness from a Two-Axle Vehicle Response by Kalman Filter, Z.L. Wang, Z.X. Tan, B.Q. Wang, K. Shi H. Xu and Y.B. Yang	**14.00-15.30** **Civil-Comp Opti 2023: Session 2** **Machine Learning-Assisted Structural Optimization** Chaired and organised by: Prof. W. Zhang, Prof. G. Yoon, Prof. A. Takezawa, Prof. S. Ryu, Prof. X. Guo, Prof. S. Youn and Prof. G. Cheng 2.1 Invited Lecture: Topology optimization considering the effect of two-phase fluid G.H. Yoon (30 minutes have been allocated for this lecture) 2.2 Machine-learning assisted topology optimization with structural gene inheritance W. Zhang, S.-K. Youn and X. Guo 2.3 Multi-objective Optimisation of Dynamic Properties and Cost of a Composite Shell B. Miller and L. Ziemianski 2.4 Sketch driven machine-learning based topology optimization Y. Wang, W. Zhang, S.-K. Youn and X Guo 2.6 Topology optimization of acoustic-structural systems based on deep transfer learning framework for enhancing sound quality L. Xu, W.S. Zhang and X. Guo	**14.00-15.15** **Civil-Comp: Session 4:** **Printed Concrete and Concrete Structures** Chaired and organised by: Prof. Y. Yuan, Prof. B.L.A. Pichler and Dr. J.-L. Zhang 4.1 Modelling the First Exothermic Peak during Hydration of Cement incorporating Blast Furnace Slag Q.Z. Sang, X. Chen, J.-L. Zhang and Y. Yuan 4.2 Application of a Multiscale Model for 3D Printed Concrete R.Y. Sheng, J.-L. Zhang, Y. Rong, J.-P. Yu and Y. Yuan 4.3 Mechanical performance of stiffening-controllable concrete using a two-component system Y. Yuan, X. Wang and Y. Tao 4.4 Measurement of the density of formed structures for concrete 3D printing Z.B. Zuo, W. De Corte, Y.L. Huang, L.L. Zhang, J. Li, and Y. Yuan

Tuesday 29th August: Room 007	Tuesday 29th August: Room 008
16.00-16.30 **Civil-Comp: Session 2 (continued):** **Vehicle Scanning Method for Bridges** Chaired and organised by: Prof. Y.B. Yang, Prof. J.D. Yau, Prof. J.P. Yang, Dr. Z.L. Wang, Dr. S. Urushdaze and Dr. D.S. Yang 2.7 Identification torsional-flexural frequencies for thin-wall beams from the rocking motion of a two-wheel test vehicle, K. Shi, X.Q. Mo, H. Xu, Z.L. Wang and Y.B. Yang 2.8 Identification of Bridge Mode Shapes from a Two-Axle Test Vehicle by Wavelet Transform, H. Xu X.Y. Chen Z.L. Wang K. Shi and Y.B. Yang	**16.00-16.30** **Civil-Comp: Session 5** **Crack identification and prevention in engineering structures** Chaired and organised by Dr J. Brozovsky 5.1 Inspection Strategy for Steel Bridge Structures based on Probabilistic Computations J. Brozovsky and M. Krejsa 5.2 An Unsupervised Crack Detection Approach Based on a Sliding Window Variational Autoencoder Y.H. Wei and Y.Q. Ni

Wednesday 30th August: Room 007	Wednesday 30th August: Room 008
9.15-10.30 **Civil-Comp 2023: Session 8** **Uncertainty Quantification and Reliability Assessment of Engineering Structures** Organised by Prof. M. Kaminski Chaired by: Prof. Ch. Song and Prof. M. Kaminski 8.1 *Invited Lecture:* Relative entropy-based reliability assessment of cable structures M. Kaminski and R. Bredow (30 minutes have been allocated for this lecture) 8.2 Uncertainty of material parameters for clay and its influence on simulation results T. Janda **Civil-Comp: Session 14** **Finite and Boundary Element Methods** Chaired by: Prof. Ch. Song and Prof. M. Kaminski 14.1 *Invited Lecture:* Towards Fully-automated High-performance Scaled Boundary Finite Element Analysis Ch. Song, J.Q. Zhang, A.S. Kumar and Y.F. Zhan 14.1 An Efficient Quadrilateral Element based on the Discrete Shear Projection Method and Free Formulation A.M. Katili and I. Katili	**9.00-10.45** **Civil-Comp 2023: Session 11 (continued)** **Structural Analysis, Design and Monitoring** Chaired by: Prof. B. Jeremic and Prof. P. Komodromos 11.2 Numerical Analysis for Multi-Support Excitation of a Long Bridge with Tall Piers S. Sengupta, S. Kanike and A. Dutta 11.5 A Design Reference for RHS Steel Beams Strengthened with FRP Subjected to Bending E. El Kassas, A. Morsy and N. Khaled 11.6 Usage of SAP2000 OAPI to parametrically investigate the effect of soil deformability on the peak seismic response of base isolated buildings C. Anastasiou and P. Komodromos 11.7 Vibration Control Effect of Locally Resonant Metamaterials on Serviceability of Floors An Analytical Investigation S. Park, J. Choi, J.S. Park and H.S. Park 11.8 A Digital Visualization Approach for Bridge Structural Health Monitoring based on Building Information Modelling H. Sun, Y. Li and L. Sun 11.9 The role of concrete cover on the load bearing capacity of reinforced concrete beams in fire a finite element analysis J. Szep, M. Habashneh and M.M. Rad 11.10 Seismic Energy Dissipation Analysis of a Low-Rise Steel Structure with Buckling Restrained Braces H. Yang and B. Jeremic

Wednesday 30th August: Room 007	Wednesday 30th August: Room 008
11.00-12.45 **Civil-Comp 2023: Session 13** **Computational Methods, Modelling and Design** Chaired by: Prof. J. Kruis 13.1 A Bistable SMA Actuator Design and Analysis M. Battaglia, A. Sellitto, V. Acanfora and A. Riccio 13.2 Optimization of the Sound Insulation Performance of a Train Body Profile in the Pantograph Area of a High-speed Train S.S. Ding, A.Q. Tian, Y.J. Zhao, J. Du and Y. Chen 13.3 Simulation of simplified urban flows using Lattice Boltzmann Method K.K. Maskey and R. Deiterding 13.4 Analytical Hierarchical Tucker Representation using Binary Trees Z. Qiu, F. Magoules and D. Pelaez 13.5 Complexity Adaptation Strategy for Order-Adaptive Elements E.D. Mora and N. Khaji 13.6 On the effects of aggregate sieving in the shielding and thermo-mechanical performance of concrete J. Zhang, B. Pomaro, G. Mazzucco, B.F. Dongmo, C.E. Majorana and V.A. Salomoni	**11.15-12.15** **Civil-Comp Opti 2023: Session 5** **Advanced lightweight structural design** Chaired and organised by Prof. W. Zhang, Assoc. Prof. L. Meng, Assoc. Prof. M. Bruggi, and Assoc. Prof. M. Langelaar 5.1 Shedding light on the impact-resisting mechanism of tension-torsion coupling metamaterials L. Meng and M. Zhong 5.2 Form-finding of reticulated shells for a given plan layout with geometric constraints M. Bruggi, B. Toth and J. Logo 5.3 Revisiting the Fibonacci spiral pattern for stiffening rib design L. Meng and J. Zhang 5.4 The effect of non-locality (or size-dependency) on optimum topologies (or material layouts) M. Tuna, P. Trovalusci and N. Fantuzzi

Wednesday 30th August: Room 007	Wednesday 30th August: Room 008
14.00-15.30 **Civil-Comp 2023: Session 6** **Structural behaviour of masonry arches and vaults numerical, analytical and experimental insight** Chaired and organised by Prof. D. Aita, Prof. K. Bagi, Prof. M. Bruggi, Prof. G. Milani and Prof. A. Taliercio 6.1 Fast stability analysis of masonry domes and vaults subjected to gravity-induced loads D. Aita, G. Milani and A. Taliercio 6.2 Detailed distinct element modeling of a Utrecht wharf cellar for the assessment of the load-bearing capacity and failure mechanism Y.P. Oktiovan, F. Messali and J. Rots 6.3 Numerical assessment of lateral capacity of concrete Maya vaults at Bonampak, Chiapas, México A. Remus, H. Kimanya, S. Tezcan and R. Perucchio 6.4 An eight-dof truss finite element for FRCM reinforced rigid substrates subjected to shear tests N. Pingaro and G. Milani 6.5 Funicular analysis of symmetric arches with finite friction accounting for stereotomy D. Aita, M. Bruggi and A. Taliercio	**13.45-15.30** Chairmen: Prof. M. Cermak and Prof. J Kruis **PARENG 2023** Chairmen: Prof. M. Cermak and Prof. J Kruis **PARENG 2023: Session 4** **Cloud Computing** 4.1 Hybrid Parallelization of Discrete Element Software for Heterogeneous Resources O. Bystrov, R. Pacevic and A. Kaceniauskas **PARENG 2023: Session 5** **Multi Core and GPU Computing** 5.1 Multisplitting Methods for Singular Nonlinear Systems J. Arnal **Civil-Comp 2023: Session 7** **Lattice discrete particle models, discrete element method, material point method and other methods supplementing the finite element method,** Chaired and organised by Prof. J. Kruis 7.1 Comments on combination of vectorized and parallel code for elastic problems M. Cermak 7.2 Calibration of beam bound model for the discrete element method R. Varga and M. Cermak 7.3 Mortar method for 2D elastic contact problems T. Svetlik, R. Varga, L. Pospisil and M. Cermak 7.4 Lattice Discrete Particle Model Tailored for Polymers J. Vorel, J. Vozab and J. Kruis 7.5 Multi-time Step Methods in Lattice Discrete Particle Models J. Kruis and J. Vorel
16.00-17.00: Author Seminar Speakers: Caroline Champney (Publisher, Elsevier) & Prof Barry Topping (Editor: “Adv in Eng Software” & “Comp & Struct”) (Prof Topping’s presentation can be found here: www.bhvt.uk/pecs23.pdf) Attend this seminar for: The latest information on: publishing; Tips and tricks on how to get your paper published; Conference Journal Special Issues and more.	

Thursday 31st August: Room 007	Thursday 31st August: Room 008
9.00-10.30 **Civil-Comp Opti 2023: Session 3** **Modelling Cementitious Composites Behaviour Aided with Machine Learning** Chaired by: Dr C. Anitescu and Dr S. Czarnecki Organised by Dr S. Czarnecki, Prof. L. Sadowski and S. Malazdrewicz 3.1 Eco-friendly mortars with granite powder and fly ash and their prediction with artificial neural networks S. Malazdrewicz and L. Sadowski 3.2 A Comparison of Neural Networks and Random Forest for predicting the subsurface tensile strength of cementitious composites containing waste materials S. Czarnecki and M. Moj **Civil-Comp Opti 2023: Session 4** **Scientific Machine Learning (PINNs)** Organised by Prof. T. Rabczuk, Dr. C. Anitescu and Prof. F. Magoules Chaired by: Dr C. Anitescu and Dr S. Czarnecki 4.1 *Invited Lecture:* Domain decomposition deep energy method for phase field analysis in brittle fracture A. Chakraborty, C. Anitescu, S. Goswami, X. Zhuang and T. Rabczuk (30 minutes have been allocated for this lecture) 4.2 Physics-Informed Graph Convolutional Networks: Towards a generalized framework for complex geometries M. Chenaud, F. Magoules and J. Alves 4.3 Deep Learning Approach to Predict Acoustic Field in Transcranial Focused Ultrasound M. Jang, M. Choi, I. Jeong, S.S Yoo, K. Yoon and G. Noh	**9.30-10.30** **PARENG 2023: Session 3** **Computational Methods for Large Systems** Chaired by: Prof. M. Yilmaz and Prof. J. Kruis 3.1 Efficient mesh deformation based on randomized RBF solvers W. Bader, A. Parret-Freaud, S. Da Veiga and Y. Mesri 3.2 Parallel software for Simulation of Emission Processes in Strong Electromagnetic Fields S.V. Polyakov, T.A. Kudryashova and N.I. Tarasov 3.3 Avoiding Communication in Two-Sided Krylov Subspace Methods H. Liu and F. Magoules and Q. Zou 3.4 A Python Interface for Symbolic and Vectorized Computation of Finite Element Matrices M. Yilmaz

Thursday 31st August: Room 007	Thursday 31st August: Room 008
11.00-12.15 **Civil-Comp 2023: Session 12** **Geotechnical and Rock Engineering** Chaired: Prof. H. Niroumand and Prof. Y. Yuan 12.1 The limit state function of slope stability analysis using Latin-Hypercube method with Janbu simplification F. Kápolnainé Nagy-Göde and Á. Török 12.2 Seismic Response of Tunnel-group Metro Station in a Rock Site R. Li and Y. Yuan 12.3 Finite Element Analysis of Land Subsidence A Case Study H. Niroumand, P. Teatini, L. Balachowski and Z. Yazdi 12.4 Simulation of Water Flux in an Unsaturated Soil in Boda Village, Hungary Y. Abduljaleel, M. Mihoub, Z.F. Ali, A. Salem, M. Amiri and A. Awad 12.5 Nano Soil-Improvement or Nano Ground-Improvement in Geotechnical Engineering H. Niroumand, L. Balachowsk2 and S. Manafvand Ardi	**11.15-12.00** **Civil-Comp 2023: Session 15** **GIS and related applications** Chaired by: Prof. A. Barsi and Professor J. Logo 15.1 Maps Towards Autonomous Driving Ecosystem A. Barsi and J.M. Lógó 15.3 The Use and Application of GIS and Remote Sensing Techniques for Monitoring Urban Growth in Koya City, Iraq-Kurdistan Region Z.F. Ali, Y. Abduljaleel, G. Pirisi, A. Salem, M. Amiri and A. Awad