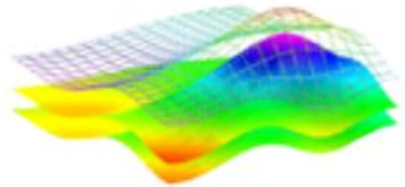


# NME 2021



## Conference Programme

Venue: Online via MS Teams

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# 4<sup>th</sup> International Conference on Numerical Modelling in Engineering (NME 2021) August 24-25, 2021, Online via MS Teams

## Chairman

**Prof. Magd Abdel Wahab**  
Ghent University, Belgium

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Dr. Denis Benasciutti, University of Ferrara, Italy  
Dr. Y.L. Zhou to Xi'an Jiaotong University, China

**KEYNOTE LECTURE****Tuesday 24 August 2021****Time:** 10:15 am to 11:00 am**Keynote speaker:** Professor Yaroslav D. Sergeyev**Affiliation:** University of Calabria, Rende, Italy and Lobachevsky State  
University, Nizhni Novgorod, Russia**Title:** Computations with numerical infinities and infinitesimals**Abstract:**

In this lecture, a recent supercomputing methodology is described. It has been introduced with the intention to allow one to work with infinities and infinitesimals numerically in a unique computational framework. It is based on the principle ‘The part is less than the whole’ applied to all quantities (finite, infinite, and infinitesimal) and to all sets and processes (finite and infinite). The new methodology evolves ideas of Cantor and Levi-Civita in a more applied way and, among other things, introduces new infinite integers that possess both cardinal and ordinal properties as usual finite numbers. The methodology uses as a computational device the Infinity Computer (patented in USA and EU) working numerically with infinite and infinitesimal numbers that can be written in a positional system with an infinite radix. On a number of examples (numerical differentiation, optimization, ordinary differential equations, divergent series, fractals, set theory, etc.) it is shown that the new approach can be useful from both theoretical and computational points of view. The accuracy of the obtained results is continuously compared with results obtained by traditional tools used to work with mathematical objects involving infinity. The Infinity Calculator working with infinities and infinitesimals numerically is shown during the lecture.

**Biographical Sketch:**

Yaroslav D. Sergeyev, Ph.D., D.Sc., D.H.C. is Distinguished Professor at the University of Calabria, Italy and Head of Numerical Calculus Laboratory at the same university. His research interests include numerical analysis, global optimization (since 2017 he is President of the International Society of Global Optimization), infinity computing and calculus, philosophy of computations, set theory, number theory, fractals, parallel computing, and interval analysis. Prof. Sergeyev was awarded several research prizes (Khwarizmi International Award, 2017; Pythagoras International Prize in Mathematics, Italy, 2010; Distinguished Lecturer, Lancaster University, UK, 2020; EUROPT Fellow, 2016; Outstanding Achievement Award from the 2015 World Congress in Computer Science, Computer Engineering, and Applied Computing, USA; Honorary Fellowship, the highest distinction of the European Society of Computational Methods in Sciences, Engineering and Technology, 2015; The 2014 Journal of Global Optimization (Springer) Best Paper Award; Lagrange Lecture, Turin University, Italy, 2010; MAIK Prize for the best scientific monograph published in Russian, Moscow, 2008, etc.). In 2020, he was included in the list of Scopus highly cited authors.

His list of publications contains more than 280 items (among them 6 books). He is a member of editorial boards of 10 international and 3 national journals and co-editor of 11 special issues. He delivered more than 70 plenary and keynote lectures at prestigious international congresses. He was Chairman of 9 international conferences and a member of Scientific Committees of more than 70 international congresses.

**CONFERENCE PROGRAM SUMMARY****Tuesday 24 August 2021**

Time	Session
10:15 am to 11:00 am	Keynote lecture
11:00 am to 1:40 pm	NMME 1
1:40 pm to 2:00 pm	Break
2:00 pm to 5:00 pm	NMCE 1

**Wednesday 25 August 2021**

Time	Session
9:30 pm to 11:10 pm	NMME 2
11:10 pm to 11:20 pm	Break
11:20 am to 1:00 pm	NMME 3
1:00 pm to 1:10 pm	Posters session
1:10 pm to 1:20 pm	Conference closing address

NMCE: Numerical Modelling in Civil Engineering

NMME: Numerical Modelling in Mechanical and Materials Engineering

**Tuesday 24 August 2021**

10:00 am to 10:15 am	<b>Opening address: Prof. Magd Abdel Wahab</b> , Ghent University, Belgium
10:15 am to 11:00 am	<b>Keynote lecture:</b> Computations with numerical infinities and infinitesimals, <b>Professor Yaroslav D. Sergeyev</b> , University of Calabria, Rende, Italy and Lobachevsky State University, Nizhni Novgorod, Russia
	<b>Session NMME 1</b>
11:00 pm to 11:20 pm	NME1299: Development and validation of sub-miniaturized geometry for bending tests to extract tensile properties of materials for nuclear and fusion applications, <b>Alexander Bakaev</b> , Aleksandr Zinovev, Chih-Cheng Chang and Dmitry Terentyev
11:20 am to 11:40 am	NME1304: Peterson charts for functionally graded rotating hollow disks with an eccentric hole, M. Cais, D. Casagrande, and <b>H.M.A. Abdalla</b>
11:40 am to 12:00 am	NME1317: Use of the Chebyshev Collocation Method for Vibration Analysis of Carbon-Nanotube Reinforced Composite Beams with Elastic Boundary Conditions, <b>Desmond Adair</b> and Martin Jaeger
12:00 pm to 12:20 pm	NME1318: Numerical investigation the effects of halon replacements on the laminar premixed combustion characteristics of CH <sub>4</sub> /air flames, <b>Zhiqiang Chen</b> , Yong Jiang
12:20 pm to 12:40 pm	NME1319: Analytical, Numerical and Experimental Analysis of the Creep Behaviour of Polyethylene Polymers, <b>A. Mostafa</b> , D. G. S. Sanchez, N. Sirach, R. V. Padilla and H. Alsanat
12:40 pm to 1:00 pm	NME1323: Numerical investigation of lithium battery using heat pipes in electric vehicles, <b>Zhao Liu</b> , Jin Zhao, Chao Wang, Yangjun Qin, Hang Zhang
1:00 pm to 1:20 pm	NME1326: Modeling the intercooling of a multi-stage compression in gas turbines using absorption chiller, <b>Kirolos A. Amin</b> , Mohamed ElHelw, Osama A. Elsami
1:20 pm to 1:40 pm	NME1300: Reinforcement learning to refine FEM meshes for acoustic problems, <b>Mathieu Gaborit</b> , Gwenael Gabard, and Olivier Dazel
1:40 pm to 2:00 pm	<b>Break</b>
	<b>Session NMCE 1</b>
2:00 pm to 2:20 pm	NME1324: 3-D forward and inverse scattering analyses for cavity in viscoelastic media using convolution quadrature time-domain boundary element method, <b>Haruhiko Takeda</b> , Takahiro Saitoh and Sohichi Hirose
2:20 pm to 2:40 pm	NME1308: Static and dynamic analysis of framed buildings by means of an equivalent multi-stepped beam, <b>Iaria Fiore</b> , Annalisa Greco, Salvatore Caddemi, and Ivo Caliò
2:40 pm to 3:00 pm	NME1310: Collapse of Shear Wall - Experimental and Numerical Analysis, Bekö Adrian and <b>Rosko Peter</b>
3:00 pm to 3:20 pm	NME1312: Numerical Simulation of Water Impoundment at a High Arch Dam Site, <b>Christine Detournay</b> , Guotao Meng, Jing Hou, Jianrong Xu, Zhao Cheng, Ryan Peterson and Peter Cundall
3:20 pm to 3:40 pm	NME1325: Importance of the geotechnical variability in the bearing capacity of shallow foundations through random fields, <b>Cristhian C. Mendoza</b> , Jorge E. Hurtado and Jairo A. Paredes
3:40 pm to 4:00 pm	NME1362: Non-conforming Spectral element method for Oseen equations and Navier Stokes equations, <b>Subhashree Mohapatra</b>
4:00 pm to 4:20 pm	NME1311: Simulation of a 2D large transformation elastoplasticity problem using the ANM, <b>El kihal Chafik</b> , Askour Omar, Belaasilia Youssef, Hamdaoui Abdellah, Braikat Bouazza, Damil Nouredine, and Potier-Ferry Michel
4:20 pm to 4:40 pm	NME1305: Structural Robustness of RC Frames under Blast events, Marco Mennonna, <b>Mattia Francioli</b> , Francesco Petrini, Franco Bontempi
4:40 pm to 5:00 pm	NME1373: Influence of pretensioned rods on structural optimization of grid shells, <b>Valentina Tomei</b> , Ernesto Grande and Maura Imbimbo

Wednesday 25 August 2021	
<b>Session NMME 2</b>	
09:30 am to 09:50 am	NME1286: Dynamic analysis of 3D solid structure using a consecutive-interpolation over polyhedral element mesh, <b><u>Hau Nguyen-Ngoc</u></b> , H. Nguyen-Xuan, Magd Abdel-Wahab
09:50 am to 10:10 am	NME1330: The reconstruction of sources in isotropic thermoelasticity systems, <b><u>K. Van Bockstal</u></b>
10:10 am to 10:30 am	NME1333: On the Design and Performance Analysis of Deadlock Controller for Automated Manufacturing Systems with Unreliable Resources, <b><u>Mohammad Ashrafal Karim Chowdhury</u></b> , M. Krid, Ahnaf Akif, and A. Mostafa
10:30 am to 10:50 am	NME1335: The Device to Simulate Movement of Teeth Jaw, <b><u>Ho Thi Thuy Duong</u></b> , Tran Nam Cuong, Nguyen Thu Khoa, Nguyen Tran Kim Hoang and Nguyen Tuong Long
10:50 am to 11:10 am	NME1338: The Numerical Modelling with FEM and ANN Tool to Predict Microstructures and Hardness for Low Carbon Steel WAAM Components, <b><u>Y. Ling</u></b> , J. Ni, M. A. Wahab, J. Antonissen and J. Vande. Voorde
11:10 am to 11:20 am	<b>Break</b>
<b>Session NMME 3</b>	
11:20 am to 11:40 am	NME1336: Prediction of wave overtopping discharge on coastal protection structure using SPH-based and neural networks method, <b><u>Bao-Loi Dang</u></b> , Quoc Viet Dang, Magd Abdel Wahab, H. Nguyen-Xuan
11:40 am to 12:00 pm	NME1339: The plane problem of poroelasticity for a semi-plane, Natalya Vaysfeld and <b><u>Zinaida Zhuravlova</u></b>
12:00 pm to 12:20 pm	NME1344: Immersed boundary methods for biofilm spread, <b><u>Rafael González-Albaladejo</u></b> , Ana Carpio
12:20 pm to 12:40 pm	NME1348: Crack propagations in functionally graded material using a phase-field NURBS-based finite element approach, <b><u>Duy Khuong Nguyen</u></b> , Magd Abdel Wahab, H. Nguyen-Xuan
12:40 pm to 1:00 pm	NME1354: The influence of superfluid core cooling in the braking index of young Pulsars, <b><u>Carlos Frajuca</u></b> and Fabio da Silva Bortoli
1:00 pm to 1:10 pm	<b>Poster presentation</b>
	NME1297: Study of Forced Vibrations of a Two-layer Plate under Harmonic Load, Vitaly N. Paimushin, Vyacheslav A. Firsov, Victor M. Shishkin, and <b><u>Ruslan K. Gazizullin</u></b>
	NME1372: Modelling the Interface between User Skin and Wearable Equipment, a case study, <b><u>Maria Filomena Teodoro</u></b>
1:10 pm to 1:20 pm	<b>Conference closing address – Prof. M Abdel Wahab</b>

## NME 2021

### INSTRUCTIONS TO SPEAKERS

- Your online oral presentation should not exceed **15 minutes**. If your presentation stretches over **15 minutes**, you must end your presentation to ensure strict adherence to the programme.
- Your presentation will be followed by a Question and Answer (Q/A) session not exceeding **5 minutes**.
- Please upload a pre-registered video presentation in your submission system. This pre-registered presentation will be used as backup and for voting for the best oral presentation award.
- All uploaded pre-registered videos will be available on the conference website:  
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- Please design your poster in one A4 paper.
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- During the poster's session Question and Answer (Q/A) is planned, and posters presenters are requested to be available to answer the questions.