



# Program CMSIM 2020

*Chaotic Modeling and Simulation International Web  
Conference*  
22-24 October 2020

Thursday, 22.10.2020

**TIME ZONE: CEST – Central European Summer**

12:00- 12:30 Preparation, interconnections

12:30 - 13:00

[Room 1](#)

Opening Ceremony

13:00-13:40

Plenary Session

[Room 1](#) (PS1)

Chair: Christos H Skiadas

Speaker: James A. Yorke and Sana Jahedi

Title:

The equations of nature and the nature of equations

13:40-14:20

Plenary Session

[Room 1](#) (PS2)

Chair: James A. Yorke

Speaker: Harold M Hastings and Tai Young-Taft

Title: Vector difference equations, Gerschgorin's theorem, and design of multi-networks to reduce spread of epidemics

14:20- 14:30 Preparation, interconnections

14:30-16.00

SCS1

Special and Contributed Sessions

[Room 1](#)

## Models and Modeling I

Gabriella Bretti, Maurizio Ceseri and Roberto Natalini  
Mathematical models for the chemical damage of built heritage

Aija Anisimova, Inese Bula  
Behaviour of Solutions of a Neuron Model

Maiya A. Rozhnova, Daniil V. Bandenkov, Victor B. Kazantsev, Evgeniya V. Pankratova

Chaotic brain extracellular matrix dynamics in the presence of periodically changing neuronal firing rate
Judita Buchlovská Nagyová Dynamical properties of a non-smooth model with different closed curve equilibria
Zaamoune Faiza Discovery Hidden Bifurcation Cells in Grid Multiscroll Chaotic Attractors Generated by Saturated Function Series
<b>16:00- 16:15 Preparation, interconnections</b>
<b>16:15-17:45</b> <b>SCS2</b> <b>Special and Contributed Sessions</b>
<b><a href="#">Room 1</a></b>
<b>Special Session:</b> <b>Nonlinear Dynamics and chaos for energy harvesting and diagnostics</b> <b>Chairs:</b> <b>Prof. Grzegorz Litak, Prof. Andrzej Rysak, Prof. Sayan Gupta</b>
<b>Rajanya Chatterjee, Sunetra Sarkar, Sayan Gupta</b> Energy harvesting from flow induced vibrations in a flexible flapper
<b>Dalroti M., R. Kumar, S. Gupta, S. F. Ali, G. Litak</b> Effects of additive noise on the energy harvesting characteristics of a base excited double pendulum
<b>Grzegorz Litak, Andrzej Rysak, Jerzy Margielewicz, Damian Gaska</b> Dynamical responses of a bistable energy harvester with hysteresis
<b>Grzegorz Litak, Marek Borowiec, Piotr Wolszczak</b> Dynamical responses of an energy harvester with impacts
<b>S. Nadarajapillai, R. Gopal and V.K. Chandrasekar, Arkadiusz Syta, G. Litak</b> On identifying flow over separation characteristics of aerofoil using cross recurrence quantification analysis
<b>Shaikh Faruque Ali, Dalroti Mohammad Huzefabhai, Rahul Kumar, Sayan Gupta, Grzegorz Litak</b> Effects of additive noise on the energy harvesting characteristics of a base excited double pendulum
<b>17:45- 18:00 Preparation, interconnections</b>
<b>18:00-18:30</b> <b><a href="#">Room 1</a> (PS3)</b> <b>Plenary Session</b> <b>Chair: Dimitrios Sotiropoulos</b> <b>Speaker: <u>George Savvidy</u></b> <b>Title: Maximally Chaotic Dynamical Systems</b>

<p>18:30-19:00 Room 1 (PS4) Plenary Session Chair: George Savvidy Speaker: <u>Marek Lampart</u> and Jaroslav Zapoměl Title: Chaos identification of a colliding constraint body on a moving belt</p>
<p>19:30-20:00 <a href="#">Room 1</a> (PS5) Plenary Session Chair: Yiannis Dimotikalis Speaker: Evelina V. Prozorova Title: Mechanism of Formation of Fluctuation Phenomena</p>
<p>20:00-20:30 <a href="#">Room 1</a> (PS6) Plenary Session Chair: Dimitrios Sotiropoulos Speaker: <u>Yiannis Dimotikalis</u> and Georgios Krasadakis Title: Cryptocurrencies Portfolio Synthesis by Max Entropy Principle</p>
<p>End of the 1<sup>st</sup> Day</p>



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12:30- 13:00 Preparation, interconnections

13:00-14:30

SCS3

Special and Contributed Sessions

Room 1

**Flows - Maps - Modeling**

Lin Shi, Irina Mursenkova

Experimental investigation of turbulent structures in a supersonic boundary layer

Rubens A. Sautter and Reinaldo R. Rosa

Stability and Symmetry Analysis of Coupled Map Lattices

Dalah Mohamed

Finite Element Method for Solving Lorenz Chaotic Model

Adrian-Josue Guel-Cortez and Eun-jin Kim

A fractional order model of the cardiac function

Sabiha Aklouche-Benouaguef, Saad Adjal, Belkacem Zeghamati  
Nanofluids in oscillatory natural convection: Scenario to chaos

Volodymyr Rusyn, Christos H. Skiadas

Simple inductor-free chaotic generator: design, research and computer modelling

14:30- 14:45 Preparation, interconnections

14:45-15:30

Room 1 (PS7)

Plenary Session

Chair: Christos H Skiadas

Speaker: **Shunji Kawamoto**

Title: Pattern Formation of Limit Cycles for 2-D Generalized Logistic Maps

15:30- 16:00 Break

**16:00- 16:15 Preparation, interconnections**

**16:15-17:00**

**SCS4**

**Special and Contributed Sessions**

**Room 1**

**Population Dynamics**

C H Skiadas and C Skiadas

How the unsolved problem of finding the Healthy Life Expectancy (HLE) in the far past was resolved: The case of Sweden (1751-2016) with forecasts to 2060 and comparisons with HALE from World Health Organization

Malcolm David Lowe

The Hidden Architecture of Meaning in Languages

Alexander V. Sosnitsky and Anatoly I. Shevchenko

Universal Cosmology and Short-Range/Long-Range Theories

**17:00- 17:15 Preparation, interconnections**

**17:15-18:45**

**SCS5**

**Special and Contributed Sessions**

**Room 1**

**Models and Modeling II**

Eun-jim Kim and Nicholas Pearce

Modelling mechano-electric feedback and arrhythmia in a simplified multiscale cardiac model

Ashutosh Maurya and Anupam Priyadarshi

Prediction of qualitative dynamics in population models through Holling's functional responses

A. Ngapasare, G. Theocharis, O. Richoux, Ch. Skokos, V. Achilleos

Chaos and Anderson Localisation in Disordered Classical Chains: Hertzian vs FPUT models

Aleksandr Petukhov

Modeling the dynamics of information representations of an individual based on the apparatus of quantum potential wells

Sergey Varbanets, Yakov Vorobyov

Sequence of PRN's from elliptic curves over  $Z\{p\}$

Avinita Gautam, Anupam Priyadarshi

Sensitivity of Dynamics of Toxoplasma Gondii and Host Immune Response

**18:45- 19:00 Preparation, interconnections**

**19:00-19:30**

**Room 1 (PS8)**

**Plenary Session**

**Chair: Christos H Skiadas**

**Speaker: A. Shvets and S. Donetskyi**

**Title: Generalizing of Attractor Notion for Spherical Pendulum Systems**

19:30-20:00

[Room 1](#) (PS9)

Plenary Session

Chair: D. Sotiropoulos

Speaker: Vladimir L. Kalashnikov and Stefano Wabnitz

Title: Spatiotemporal Turbulence in a Multimode Fiber Laser

20:00-20:45

SCS6

Special and Contributed Sessions

[Room 1](#)

Models and Modeling III

Ilknur Kusbeyzi Aybar, Brigita Fercec, O. Ozgur Aybar, Masa Dukaric

The qualitative analysis of biochemical systems by using the methods of computational algebra

A. Maragkaki, G. Matalliotakis

Vaccination coverage against seasonal influenza of workers in the Primary Health Care units in the Prefecture of Chania

End of the 2<sup>nd</sup> Day



# Program CMSIM 2020

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22-24 October 2020

Saturday, 24.10.2020

**TIME ZONE: CEST – Central European Summer**

12:30- 13:00 Preparation, interconnections

13:00-14:45

SCS7

Special and Contributed Sessions

Room 1

**Time Series Analysis**

Radim Pánis, Gopal Bhatta, Zdeněk Stuchlík  
Modified RQA analysis of the  $\gamma$ -ray Variability in Blazars

U. PANIVENI

A study of supergranulation

Julio E. Sandubete, Lorenzo Escot, and Simone Giannerini  
Estimating Lyapunov exponents from noise-contaminated time-series data

Octaviana Datcu, Florentina Nicolau, Jean-Pierre Barbot  
A digital receiver for an analog transmitter

Dimitrios Dellaportas and Anna Alexandratou  
Heat transfer by sea water to air and environment's impacts

Jafarzadeh Yousef  
Computational method for solving systems of linear and nonlinear Fredholm integral equations

Jafarzadeh Yousef  
Best Trapezoidal Approximation Solution of fuzzy nonlinear equations

14:45- 15:00 Preparation, interconnections

<b>15:00-16:45</b> <b>SCS8</b> <b>Special and Contributed Sessions</b>
<a href="#"><u>Room 1</u></a>
<b>CHAOS and General Dynamics</b>
Mauricio Díaz Distributional chaos of type 2 via IP families applied to Nash equilibrium
Gromov V. A., Baranov F. S., Tsybakin A. Yu. Prediction After a Horizon of Predictability: Non-Predictable Points and Partial Multi-Step Prediction for Chaotic Time Series
R. Hoseini and S. Behnia Pseudo-random bit generator based on 2D chaotic map and its application in image encryption
Vijay K. Yadav and Amit K. Mishra Finite-time synchronization of multi-scroll chaotic systems with sigmoid nonlinearity and uncertain terms
Haidar Sabbagh Spiral Break up due to Core Expansion and its Elimination
Konstantinos N. Zafeiris and Marianna Koukli Some remarks on the Corona-virus pandemic in Europe
<b>16:45- 17:00 Break</b>
<b>17:00-17:30</b> <a href="#"><u>Room 1</u></a> (PS10) <b>Plenary Session</b> <b>Chair: K. Zafeiris</b> <b>Speaker: <u>Tatiana F. Filippova</u></b> <b>Title: Interacting Populations: Dynamics and Viability in Bounded Domains under Uncertainty</b>
<b>17:30- 17:45 Preparation, interconnections</b>
<b>17:45-19:30</b> <b>SCS9</b> <b>Special and Contributed Sessions</b>
<a href="#"><u>Room 1</u></a>
<b>Chaotic Dynamics</b>
Tai Young-Taft, Harold M Hastings Time series analysis of GDP scaling and dynamical regimes
Radek Halfar Dynamics of cardiac cell
Valeriy Grytsay Spectral analysis and invariant measure in studies of the dynamics of the Krebs cycle



<p style="text-align: center;">Jiří Tomčala Examination of Sudden Jumps in the Time Course of Approximate and Sample Entropy Values of Supercomputer Power Consumption</p>
<p style="text-align: center;">Bernd Binder Discrete Rotation-Translation Sequences on Closed Loops</p>
<p style="text-align: center;">Dalah Mohamed Multi-Grid Method to Simulate Growing Dynamical Systems: Codes in Matlab</p>
<p style="text-align: center;"><b>19:30- 19:45 Preparation, interconnections</b></p>
<p style="text-align: center;">19:45-20:15 Plenary Session <a href="#">Room 1</a> (PS11) Chair: D. Sotiropoulos Speaker: <a href="#">Jialin Cui</a> and <a href="#">Bo-Wen Shen</a> Title: Applying a Kernel PCA Method to Reveal Coexisting Attractors within a Generalized Lorenz Model</p>
<p style="text-align: center;">20:15-20:45 Plenary Session <a href="#">Room 1</a> (PS12) Chair: D. Sotiropoulos Speaker: <a href="#">J.P. Lebacque</a> and M.M. Khoshyaran Title: Chaotic behavior of dynamical systems associated with dynamic traffic assignment in transportation</p>
<p style="text-align: center;">20:45-21:10 <a href="#">Room 1</a> Closing Ceremony</p>
<p style="text-align: center;">End of the Conference</p>

### Thursday, 22.10.2020

#### Event link

<https://isast.webex.com/isast/onstage/g.php?MTID=e9a15151cc547aa341dfc8b10a56d0d71>

<b>Eventnumber:</b>	152 136 3414
<b>Eventpassword:</b>	cmsim2020
<b>VideoAddress:</b>	1521363414@isast.webex.com You can also dial 62.109.219.4 and enter your meeting number
<b>Audioconference:</b>	United Kingdom Toll +44-20-7660-8149 <a href="#">Show all global call-in numbers</a> Access code: 1521363414

### Friday, 23.10.2020

#### Event link

<https://isast.webex.com/isast/onstage/g.php?MTID=eb3c01402c92b328dd23826e565d7633c>

<b>Eventnumber:</b>	1524013452
<b>Eventpassword:</b>	cmsim2020
<b>VideoAddress:</b>	1524013452@isast.webex.com You can also dial 62.109.219.4 and enter your meeting number
<b>Audioconference:</b>	United Kingdom Toll +44-20-7660-8149 <a href="#">Show all global call-in numbers</a> Access code: 1524013452

### Saturday, 24.10.2020

#### Event link

<https://isast.webex.com/isast/onstage/g.php?MTID=ef201bd3fd35940d496f3058d1d3cd041>

<b>Eventnumber:</b>	1527895017
<b>Eventpassword:</b>	cmsim2020
<b>VideoAddress:</b>	1527895017@isast.webex.com You can also dial 62.109.219.4 and enter your meeting number
<b>Audioconference:</b>	United Kingdom Toll +44-20-7660-8149 <a href="#">Show all global call-in numbers</a> Access code: 1527895017