



# Program CHAOS2025

**18<sup>th</sup> Chaotic Modeling and Simulation International  
Conference** Athens, Greece, 17 – 20 June, 2025, Hybrid

**Ilisia Hotel -** [Michalakopoulou 25, Athens, 11528, Greece Tel.+30 2107244051](#)

**Tuesday, 17.6.2025**

**TIME ZONE: EEST – Eastern European Summer Time**

**8:30 – 10:00**

**Room 1**

Registration

**10:00 – 10:40 -**

**Room 1**

[Opening](#)

**10:40-11:00**

**Plenary Session**

[Room 1](#) (PS1)

**Chair: Jenny Magnés**

**Speaker: Leszek Sirko**

**Pavel Kurasov, Omer Farooq, Michał Ławniczak, Szymon Bauch,**

**Mats-Erik Pistol, Matthew de Courcy-Ireland, and Leszek Sirko**

*Institute of Physics, Polish Academy of Sciences, Warsaw, Poland*

**Title:**

**Families of Isoscattering Quantum Graphs and Microwave Networks**

**11:00- 11:30 Coffee Break**

**11:30-14.00**

**SCS1**

**Special and Contributed Sessions**

[Room 1](#)

**Complex**

**Chair: Jenny Magnés**

[Room 2](#)

**Theory-Time Series**

**Chair: TBA**

**Alexander V. Glushkov**

**Advanced Computational Modelling Complex Dynamical  
Systems: The Earth Angular Momentum Balance  
Nonstationary Model**

**Alexander Glushkov and Olga Y. Khetselius**

**Chaos in Environmental Radioactivity Dynamics:  
Analyses of the Radon Time Series**

**M.M. Khoshyaran and J.P. Lebacque**

**Complex Dynamics induced in Transportation Systems  
by Competitive Optimization of Departure Times of  
Travelers**

**Engin Kandiran and Berke Tunç**

**Nonlinear Behaviour of Air Pollution Concentration  
Time Series in Turkey**

Jenny Magnes, Katherine Canavan, Raffaella Zanetti, and Susannah Zhang Incremental Noise Analysis in an Experimental Complex System	Andrey Svinarenko A Nonlinear Interaction Dynamics of Applied System of the Coupled Autogenerators: Numerical Analysis of Time Series, Chaos and Bifurcations
Olivia Trader, Dimitrios Tzezos, and Jenny Magnes Age-Dependent Complexity of Locomotion in Caenorhabditis elegans	
Dimitrios Tzezos, Olivia Trader, Nicolas Hugo Reyes Cardozo, Juan Merlo Ramirez, and Jenny Magnes Investigating the Complexity of C. elegans Locomotion in Microgravity Conditions	
A.N. Valyaev, S.D. Litvinov, and S.V. Petrov Application of our Nanotechnological LitAr Material for Treatment of Complex Deceases	
14:00-15:00 Lunch	
15:00-16:30 SCS2 Special and Contributed Sessions	
<a href="#"><u>Room 1</u></a>	<a href="#"><u>Room 2</u></a>
<b>SPECIAL SESSION</b> Special session of LAFIM of HMU on “Accounting and Financial Management” Chair: Christos Floros	<b>Models</b> Chair: TBA
Konstantinos Kapetanakis and Christos Floros Diverging Effects of Environmental Policy Stringency and Climate Adaptation Readiness on U.S. Banks	Valeriy S. Abramov Modeling Background Modifications of Relic Photons
Panagiotis Kosmidis and Christos Floros Artificial Intelligence and Cryptocurrency Trading	Anna Ignatenko and Alexande Glushkov Chaotic Damage Dynamics of Engineering Systems under Varying Operational Conditions: Numerical Analysis and Modelling
Evangelos Varouchas, Stavros Arvanitis, Emmanuel Mamatzakakis and Christos Floros Gender Diverse Boards and Earnings Manipulation: The Role of Democracy	Konstantinos Kanoupakis, Yiannis Dimotikalis and Christos H. Skiadas Modelling COVID19 Pandemic Evolution Using a Heuristic Piecewise Regression Model

<p><b>Efthalia Tambouratzi, Eleftherios Charamis, and Dimitrios Charamis</b></p> <p><b>Tax audit in Greece: Investigating Requirements per Taxation Area and Type of Tax to restrict Tax Evasion and assist Collectibility</b></p>	<p><b>David C. Ni</b></p> <p><b>New Observations of Galaxies and Black Holes in the early Universe via James Webb Space Telescope (JWST) Challenge the Existing Cosmological Models. Modified Lambda CDM, Galactic Dark Matter (GDM) etc. are among the proposed Theories for the Observations with further Improvements needed</b></p>
<p><b>Dimitrios Vortelinos, Yiannis Yiannoulis, Vassiliki Balla, and Panagiotis Ballas</b></p> <p><b>Key Audit Matters in Greece: Empirical Analysis of Disclosure Patterns, Determinants, and Readability in Independent Audit Reports</b></p>	<p><b>Danial Saadatmand, David Amunden, and Stephen Anco</b></p> <p><b>Scattering of Dark and Bright Sphalerons with a False Vacuum in the <math>\phi^4</math> Model with a Nonsymmetric Potential</b></p>
<b>End of the 1<sup>st</sup> Day</b>	



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**Wednesday, 18.6.2025**

**TIME ZONE: EEST – Eastern European Summer Time**

**10:00-11:30**

**SCS3**

**Special and Contributed Sessions**

**Room 1**

**Room 2**

**Attractors - bifurcation  
Chair: TBA**

**Field  
Chair: S. Sohrab**

**Efrosiniia Karatetskaia, Aikan Shykhmamedov,  
Konstantin Soldatkin, and Alexey Kazakov  
On the Creation of Hyperchaotic Attractors with Three  
Positive Lyapunov Exponents**

**Ivan G. Grabar, Yuri O. Kubrak, and Mykola M.  
Marchuk  
Synthesis of Anisotropic Multifractals by the  
Method of Brownian Dynamics in an Orthogonal  
Anisotropic Field**

**Enrique Miranda  
Fully Behavioral SPICE Simulation of the Rössler  
Attractor**

**Alexander M. Krot  
Derivation of Wave Equations and Investigation of  
Gravitational Waves in the Gravitational Field of a  
condensing Cosmogonical Body based on the  
Statistical Theory**

**Valery Gaiko  
Bifurcations, Chaos and Multistability in Polynomial  
Dynamical Systems**

**Chong Liu  
Dynamics of Superregular Breathers in Vector Field**

**J. Galan-Vioque and J. Valverde  
Bifurcations and Chaos in Non-holonomic Dynamical  
Systems: Application to the Rattleback**

**Siavash H. Sohrab  
Universality of Quantum Field Theory, Schrödinger  
and Dirac Wave Equations and their Physical  
Foundations**

**11:30- 12:00 Coffee Break**

**12:00-14:00**

**SCS4**

**Special and Contributed Sessions**

**Room 1**

**Room 2**

**Chaos-Chaotic  
Chair: TBA**

**Models  
Chair: TBA**

**Philippe Beltrame and Pierre Trontin  
Chaotic Transport via Ratchet of Airborne Particles  
under Microgravity**

**Andrey Svinarenko and Eugeny Ternovsky (PhD  
Stud)  
Stabilization of Course of Ships and Damping  
Vibrations Caused by Waves: Nonlinear Differential**

	Equations Model and Chaos Optimal Control Theory
<b>Mauricio Díaz</b> <b>Exploring (a,b)-Chaos: Unraveling Chaotic Dynamics through Furstenberg Families and Cellular Automata</b>	<b>Lidia Dzierzbicka-Głowacka, Maciej Janecki, Dawid Dybowski, Artur Nowicki, Piotr Pieckiel, and Jacek Wittbrodt</b> <b>A Prognostic Tool for Modeling the Optimal Environmental Conditions for Fish</b>
<b>Livio Fenga and Luca Biazzo</b> <b>A Chaotic Model for Predicting Social Unrest in the Presence of Fake News</b>	<b>Francesca Grasseti</b> <b>Murky Waters: A Dynamic Model for Marine Pollution</b>
<b>Ivan G. Grabar and Alexander V. Voznyuk</b> <b>Chaotics as a Quantitative Tool in Comparative Linguistics Problems</b>	<b>Olga Khetselius, Alexander Glushkov, and Mykhaylo Lobachev</b> <b>Dynamics of Multi-layers Neural networks on the Basis of Photon Echo: Effects of Chaos and Stochastic Resonance</b>
<b>Anna Ignatenko</b> <b>Chaotic Phenomenon for Rydberg Atoms in an AC Electromagnetic Field</b>	<b>J. Leonel Rocha, S. Carvalho, M. Ramires, G. Pereira, and F. Martins</b> <b>Decomposing Dense Weighted Neural Networks: A SmallWorld Analysis of the Simplified C. Elegans Network</b>
<b>Aija Jakovleva</b> <b>Chaotic Behaviour of a discrete Neuron Model</b>	<b>Yakup Ari</b> <b>Nonlinear GARCH Volatility Linkage among Airline Companies: Evidence from QVAR and TVP-VAR Connectedness Approaches</b>
<b>14:00-15:00</b>	
<b>LUNCH</b>	
<b>15:00 - 21:00</b>	
<b>Excursion to Acropolis and the Archeological Museum ending with a Greek “Meze” in a local Taverna</b>	
<b>End of the 2<sup>nd</sup> Day</b>	



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Thursday, 19.6.2025

**TIME ZONE: EEST – Eastern European Summer Time**

9:30-11:30

SCS5

Special and Contributed Sessions

### Room 1

Nonlinear  
Chair: TBA

Alexander V. Glushkov  
Nonlinear Dynamics of Relativistic Backward-Wave Tube:  
Chaos, Bifurcations and Strange Attractors

Ana Maria Guedes  
Unveiling Chaos in Electricity Prices on the Iberian  
Peninsula: A Nonlinear Analysis of MIBEL

Anna Ignatenko  
Nonlinear Dynamics of Molecular Systems in an External  
Electromagnetic Field: Chaos and Strange Attractors

Adela Ionescu  
The parameter influence on LMI feasibility framework in  
nonlinear dynamical systems

Olga Y. Khetselius  
Advanced Complex Plane Field and Differential Equations  
Approach to Nonlinear Dynamics of the Industrial City's  
Chaotic Atmospheric Ventilation

Olga Y. Khetselius  
Study of Nonlinear Dynamics of Complex Chaotic Systems:  
Combined Chaos-Geometric and Neural Networks  
Algorithms and Application to Environmental systems

Yu. A. Kosevich and I. P. Koroleva  
Nonlinear Dynamics in and Transmittance through Two-  
Path Anharmonic Atomic-Scale Junctions

### Room 2

Theory  
Chair: TBA

Luca Grilli, Domenico Santoro, Francesca Romano,  
and Costantino Dell'Osso  
Use of Sentiment Analysis to improve Portfolio  
Optimization

Reza Malek-Madani  
Recent Results on the Stability of Laser Beams  
propagating in a Turbulent medium

U. Paniveni  
Supergranulation, A Prominent Convective  
Phenomenon

Evgeniy D. Pechuk and Tatyana S. Krasnopolskaya  
Autocorrelation Function and Correlation Dimension  
of a Discrete-time Heartbeat Signal

Haidar Sabbagh  
Logarithmic Susceptibility of the Escape Problem in  
Periodic Potentials

Jan Ševčík and Lenka Příbylová  
In-Phase and Anti-Phase Responses of Coupled  
Interneurons to External Current Stimuli

11:30-12:00	
Coffee Break	
12:00-14:00 SCS6 Special and Contributed Sessions	
<a href="#">Room 1</a>	<a href="#">Room 2</a>
Nonlinear Chair: TBA	Theory Chair: Tomasz Kapitaniak Co-Chair: Evangelia Petraki
Nikolai Magnitskii On Chaotic Multistability in Nonlinear Systems of Differential Equations	Wojciech Szumiński and Tomasz Kapitaniak Dynamics and Non-integrability of the Variable- length Double Pendulum: Exploring Chaos and Periodicity via the Lyapunov Refined Maps
Andrey Svinarenko and Alexander Glushkov Optimal Control and Nonlinear Dynamics of Resonance Radiation Processes in Laser Isotopes Separation Systems and Devices: Chaos and Dynamical Invariants	Asher Yahalom A Reduced Variational Formalism of Non-Barotropic Fluids
George Vostrov, Andriy Khrinenko, and Oleksandr Shcherbaniuk Chaotic Properties of Trajectories of Nonlinear Dynamic Systems	Evangelia Petraki FDB multilingual databases: organization and automatic conceptual categorization of data records within the framework of the FDB model
George Vostrov, Andriy Khrinenko, and Oleksandr Shcherbaniuk Methods and Algorithms for Analysis of Behavior of Fractal and Chaotic Components of Cyclic Trajectories of Nonlinear Congruent Dynamical Systems	Ergun Eray Akkaya Unveiling Chaos: AI's Analysis of Raw Nonlinear Time Series Data
Devasmito Das, Ina Taralova, Jean-Jacques Loiseau, Manoj Pandey, and Tsonyo Slavov Fractional-Order Coupled Oscillators for Synchronization- Based Gait Control in Hexapod Robots	Teddy Craciunescu, Andrea Murari, Riccardo Rossi, and Michela Gelfusa Prediction of Fusion Plasma Disruption Prediction based on Time Series Complexity Changes Detection
Alexey Kazakov with E. Karatetskaia, K. Safonov, and D. Turaev. Robust Chaos in a Totally Symmetric Network of Four Phase Oscillators	
14:00-15:00 Lunch	
15:00-15:40 <a href="#">Room 1</a> (PS2) Plenary Session Chair: Christos H Skiadas <b>Speaker: <u>Victor J Law</u></b> <i>School of Mechanical and Materials Engineering, University College Dublin, Belfield, Dublin, Ireland</i> <b>Title: Solar Box Cooker-dryer-extractor: Designing out Complexity</b>	
20:00 – 24:00	
Farewell Dinner Greek food, music and dances	
End of the 3 <sup>rd</sup> Day	



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**Friday, 20.6.2025**

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**10:00-11:30**

**SCS8**

**Special and Contributed Sessions**

### Room 1

**Quantum- system  
Chair: TBA**

**Andrey Svinarenko**

**Nonlinear Dynamics of Semiconductor Quantum Generators and  
Optical Resonator Systems: Chaos, Bifurcations and Attractors**

**Olga Khetselius**

**Atomic Parity Non-conservation in Atoms and Dynamical  
Enhancement of Weak Interaction: Quantum Chaos**

**Hera Antonopoulou, Yannis C. Stamatiou, and Panagiotis E.  
Nastou**

**Quantum Disruptors: Subtle quantum interference strategies for  
attacking Quantum Algorithms - an application to Shor's  
Algorithm**

**Lidia Dzierzbicka-Glowacka, Dawid Dybowski, Maciej Janecki,  
Artur Nowicki, Tamara Jadczyzyn, Stefan Pietrzak, Jan  
Jadczyzyn, and Aleksander Mach**

**Digital Decision support System for Environmentally-friendly  
Agriculture EnviAgri**

**Lidia Dzierzbicka-Głowacka, Dawid Dybowski, Maciej Janecki,  
and Artur Nowicki**

**Spatial-temporal Variability of the Southern Baltic Ecosystem  
Parameters using Mathematical Methods**

### Room 2

**Theory  
Chair: Yiannis Dimotikalis**

**Georges Sarafopoulos, Despoina Terzopoulou,  
and Kosmas Papadopoulos  
Dynamics of a Heterogeneous Duopoly Game  
in R&D Efforts with Taxation**

**Gwang-Jin O and Vasileios Drakopoulos  
Generalised Fractal Interpolation Functions  
with Partial Self-similarity**

**Evelina V. Prozorova**

**The Influence of Angular Momentum on the  
Structure of a Crystalline Body and its Surface**

**T.F. Kamalov**

**Physics of Chaos**

**V.M. Somsikov**

**The Role of the Structure of Matter in the  
Evolutionary Picture of the World**

**11:30 - 12:00**

**Coffee Break**

**12:00-14:00**

**SCS9**

**Special and Contributed Sessions**



<u>Room 1</u>	<u>Room 2</u>
<b>Systems-Theory Chair: TBA</b>	<b>Complex Nonlinear Dynamics toward Chaotic Supremacy Chairs: Fumiyoshi Kuwashima &amp; Takashi Isoshima</b>
<b>Oleksii Horchakov and Aleksandr Shvets  Generalized Intermittency in Ideal Dynamic Systems</b>	<b>Yoshitaka Itoh, Daiki Matsui, Kaito Kato, and Takuji Kousaka Training Gate Neurons with an Error Function Including a Normalization Term for Bifurcation Diagram Reconstruction of the Tent Map</b>
<b>Vladimir L. Kalashnikov, Evgeni Sorokin, Alexander Rudenkov, and Irina T. Sorokina Energy Scaling and Negative Temperature Transitions in Nonequilibrium Dissipative Systems</b>	<b>Misa Fujita  Surrogate Data Analysis of Chaotic Search for Solving the Steiner Tree Problem in Graphs</b>
<b>Sungju Moon Exploring Kneading Numbers of an Extended Lorenz System</b>	<b>Keiko Kohmoto and Fumiyoshi Kuwashima Optimal Wavelength for Melanin Pigment based on Transmittance and Temperature Rise from 778.57 to 787.67nm</b>
<b>Rubens A. Sautter, Reinaldo R. Rosa, Juan A. Valdivia, Pablo Medina, and Carlos Falandes Multifractal Signature of Extreme Fluctuations in Chaotic Coupled Systems</b>	<b>Anna Ignatenko, Andrey Svinarenko, and Mykhaylo Lobachev Analysis of the beryllium-7 Activity Concentration Dynamics in the Atmospheric Environment after the Fukushima Daiichi NPP Emergency: Chaos-geometric and Artificial Intelligence Modelling</b>
<b>Rodica Luca Tudorache and Alexandru Tudorache Existence of Positive Solutions to a System of Fractional q- Difference Equations with Multi-Point Boundary Conditions</b>	<b>Yuto Fukui, Hiroyuki Asahara, Haruna Matsushita, Yuu Miino, and Takuji Kousaka Homoclinic Tangency Derivation Method in Two-dimensional Discrete Systems</b>
<b>Emily Bamber The Non-integrability of a Class of Quartic Hamiltonians</b>	
<b>Aristotelis Gkiolmas, Aikaterini Benisi, Zografia Papanagiotou, Elina Karagiannidou, Gianna Katsiampoura, Constantine Skordoulis, Nicholas Petropoulos, and Alexandra-Triantafyllia Papanagiotou Tools for teaching Chaos in the Primary and Secondary Education, and their learning outcomes</b>	
<b>14:00- 15:00 LUNCH</b>	
<b>15:00-15:30</b>	

**Room 1** (PS3)**Plenary Session****Chair: Leszek Sirko****Speaker: Bo-Wen Shen**

San Diego State University

**Title: Enhancing Predictability through Transformers: Downscaling and Upscaling in a High-Dimensional Generalized Lorenz Model****15:30-16:00****Room 1** (PS4)**Plenary Session****Chair: Christos H. Skiadas****Speaker: Wieslaw M. Macek***<sup>1</sup>Institute of Physical Sciences, Faculty of Mathematics and Natural Sciences, Cardinal Stefan Wyszyński University, Warsaw, Poland**<sup>2</sup>Space Research Centre, Polish Academy of Sciences, Warsaw, Poland***Title: Multifractal Scaling Laws in the Universe Distribution of Galaxies****16:00- 16:30 Coffee Break****16:30-17:00****Room 1****Closing Ceremony****End of the Conference**

# ROOM 1

Meeting link:

<https://isast.webex.com/isast/j.php?MTID=m546c98467cd9519e47bb1ae1990f888f>

Meeting number:

2744 011 5456

Password:

nJZjyyzn452

Host key:

900550

Join by video system

Dial 27440115456@isast.webex.com

You can also dial 62.109.219.4 and enter your meeting number.

Join by phone

+44-20-7660-8149 United Kingdom Toll

Access code: 2744 011 5456

Host PIN: 1358

[Global call-in numbers](#)

## ROOM 2

Meeting link:

<https://isast.webex.com/isast/j.php?MTID=m91b65bc412365b536287f4fe04364c49>

Meeting number:

2741 564 5804

Password:

SMuXF8b7Ub8

Host key:

544812

Join by video system

Dial 27415645804@isast.webex.com

You can also dial 62.109.219.4 and enter your meeting number.

Join by phone

+44-20-7660-8149 United Kingdom Toll

Access code: 2741 564 5804

Host PIN: 1358

[Global call-in numbers](#)