

29th SCHOOL – CONFERENCE ON DYNAMICAL SYSTEMS AND COMPLEXITY

NCSR “DEMOKRITOS”, ATHENS, 17 - 26 JULY 2023

DAILY PROGRAM

Monday, July 17

Chairman: Vassilios Constantoudis

9:30 - 10:30: Tassos Bountis (University of Patras),
“Integrability and Chaos in Dynamical Systems”

10:30 - 11:30: Stavros Anastassiou, (University of W. Macedonia)
“Nonlinear Dynamics: A Mathematical Introduction”

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

12:00 - 13:00: Panos Kevrekidis (University of Massachussets)
“The Discrete Nonlinear Schrödinger Equation: A Wealth of Physical Phenomena”

13:00 - 13:30: (online) Spyros Tzamarias (Aristotle University of Thessaloniki)
“Linear and Nonlinear Phenomena in Particle Physics”

13:30 - 15:00: **Lunch Break**

Chairman: Tassos Bountis

15:00 - 16:00: Vasileios Drakopoulos (University of Thessaly)
“The Geometry of Fractals and its Applications”

16:00 - 16:30: Vassilios Constantoudis (NCSR “Demokritos”)
“Fractals in Chip Industry: Scaling analysis in the Roughness Characterization of Transistor Structures”

16:30 - 17:00: **Coffee Break**

17:00 - 18:00: Anastassios Bezerianos (University of Patras)
“Graph Theory and Source/Sensor EEG Analysis Cognitive Workload Assessment”

18:00 – 18:30: Vassilios Kovanis (Virginia Tech Innovation Campus, Alexandria VA, USA)
“Quantum Noise on Photonic Limit Cycles”

Tuesday, July 18

Chairman: Marko Robnik

9:30 - 10:30: Yannis Kominis (National Technical University of Athens)
“Hamiltonian Dynamics for Plasma Physics and Fusion”

10:30 – 11:30: Haris Skokos (University of Cape Town, South Africa)
“Chaos in Hamiltonian Nonlinear Lattices”

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

12:00 - 13:00: Panos Patsis (Research Center for Astronomy and Applied Mathematics, Academy of Athens)
“Order and Chaos in Galactic Bars: Utilizing Nonlinear Dynamics to Elucidate Galactic Morphologies”

13:00 - 13:30: Matthaios Katsanikas (Research Center for Astronomy and Applied Mathematics, Academy of Athens)
“Pitchfork Bifurcations and Dynamical Matching in a Caldera-type Hamiltonian System”

13:30 - 15:00: **Lunch Break**

Chairman: Haris Skokos

15:00 - 16:00: George Voyatzis (Aristotle University of Thessaloniki)
“New Developments in Celestial Mechanics and Astrodynamics”

16:00 - 16:30: Ioannis Golias (Aristotle University of Thessaloniki)
“Chaos and Order in Space Applications: A Hands-on Approach”

16:30 - 17:00: **Coffee Break**

17:00 - 18:00: Kleomenis Tsiganis - Ioannis Golias (Aristotle University of Thessaloniki)
“Applications of Nonlinear Dynamics in Space Situational Awareness”

18:00 – 18:30: Yannis Antonenas (NTUA)
“Resonance Location and Chaos Quantification in Fusion Plasmas”

Wednesday, July 19

Chairman: Yannis Kominis

- 9:30 - 10:30: Marko Robnik (University of Maribor)
“Introduction to Quantum Chaos”
- 10:30 - 11:30: Vasileios Basios (Université Libre de Bruxelles)
“Biological Information Processing, Chaos, and Extended Bayesian Inference”
- 11:30 - 12:00: **Coffee Break**
- 12:00 - 13:00: Dimitris Frantzeskakis (University of Athens)
“Shock Waves in Eulerian Fluids”
- 13:00 - 13:30: Theodore Horikis (University of Ioannina)
“PDEs for Wave Propagation on Shallow Water”
- 13:30 - 15:00: **Lunch Break**

Chairman: Dimitris Frantzeskakis

- 15:00 - 16:00: Stamatios Nicolis (Université de Tours, Université d’Orléans, CNRS, France)
“Arnol’d Cats on the Interface between Integrability and Chaos”
- 16:00 - 16:30: Ko van der Weele (University of Patras)
“Roll Waves as Relaxation Oscillations”
- 16:30 - 17:00: **Coffee Break**
- 17:00 - 17:30: George Koutsogiorgos (University of Ioannina)
“Introduction to Asymptotic Theory: A Connection Between NLS and KdV”
- 17:30 - 18:00: Ioannis Ioannou-Sougliridis (Laboratoire d’Acoustique de l’Université du Mans (LAUM))
“Nonlinear propagation in 1D and 2D acoustic networks”
- 18:00 – 18:30: George Kanellopoulos and Dimitrios Razis (University of Patras)
“A Dynamical Systems View of Nonlinear Waves in Open Channel Flow”

Thursday, July 20

Chairman: Minos Axenides

- 9:30 - 10:30: Dimitris Kugiumtzis (University of Thessaloniki)
“Complex Networks Estimation from Multivariate Time Series”
- 10:30 - 11:30: Theodoros Karakasidis (University of Thessaly)
“Applications of Non-linear Time Series Analysis in Physics and Engineering”
- 11:30 - 12:00: **Coffee Break**
- 12:00 - 13:00: Georgia Himona (National Technical University of Athens)
“Isochrons, Time Crystals and Synchronization of Tunable Photonic Oscillators”
- 13:00 - 13:30: Johanne Hizanidis (University of Crete, Heraklion)
“Dynamical Properties of Neuromorphic Josephson Junctions”
- 13:30 - 15:00: **Lunch Break**

Chairman: Dimitris Kugiumtzis

- 15:00 - 16:00: George Papaioannou (CRANS, University of Patras)
“Complexity of EEG-extracted Features, in an Aristotelian Cognitive Tasks Experiment Can Classify Healthy Controls and Patients of Eating Disorder Anorexia Nervosa (ED)”
- 16:00 - 16:30: Panayotis Papaioannou (Eurobank SA, Global Markets & Asset Management)
“Advances, Recent Developments and Challenges in Financial Machine Learning”
- 16:30 - 17:00: **Coffee Break**
- 17:00 - 17:30: (online) Francesca Minicucci (University “G. d’Annunzio” of Chieti-Pescara)
“Fractal dimension of choroidal SDOCT images as a potential biomarker in the detection of retinitis pigmentosa”
- 17:30 – 18:30: Round Table Discussion I: *Dynamical Systems and Complexity in the Natural Sciences*

Friday, July 21

Chairman: Yannis Almirantis

- 9:30 - 10:30: George Kastis (Academy of Athens Research Center Mathematics)
“Analytic Reconstruction Methods for Positron Emission Tomography”
- 10:30 - 11:30: Nikolaos Protonotarios (Academy of Athens Research Center Mathematics)
“Medical Imaging: Analytic Reconstructions for Emission Tomography”
- 11:30 - 12:00: **Coffee Break**
- 12:00 - 12:30: Georgia Paraskevopoulou (University of Athens)
“Inverse EEG Problem and Applications”
- 12:30 – 13:30 Nikolaos Dikaios (Mathematics Research Center, Academy of Athens)
“Deep Learning and Mathematical Modelling for the COVID-19 Pandemic”
- 13:30 - 15:00: **Lunch Break**

Chairman: Panos Patsis

- 15:00 - 16:00: Panos Argyrakis (University of Thessaloniki)
“Introduction to Complexity Science”
- 16:00 - 16:30: Athanassios Manos (CY Cergy Université de Paris)
“The Role of Synaptic and Structural Plasticity in the Long-term Desynchronization Effect by Coordinated Reset Stimulation”
- 16:30 - 17:00: **Coffee Break**
- 17:00 - 18:00: Kostas Kalimeris (Mathematics Research Center Academy of Athens)
“Revisiting Linear PDEs via the Fokas Method”

Saturday, July 22

10:00 – 13:00: Yannis Kominis (National Technical University of Athens):

Hands on Educational Experience with Bifurcation Phenomena in Physics and Engineering”

SUNDAY JULY 23 FREE DAY

Monday, July 24

Chairman: Vasileios Basios

- 9:30 – 10:30: Tassos Bountis (University of Patras)
“A Personal View Inspired by Work with Constantino Tsallis”
- 10:30 – 11:30: Georgios Livadiotis (Princeton University)
“Kappa Distributions and Tsallis Entropy: Bringing Nonextensive Statistical Mechanics in Space Science”
- 11:30 - 12:00: **Coffee Break**
- 12:00 – 13:00: Constantino Tsallis (Rio de Janeiro, Brazil)
“Science, an Endless Metaphor”
- 13:00 – 13:30: Filippos Vallianatos (University of Athens)
“Applications of Tsallis Thermostatistics to Geoscience”

13:30 - 15:00: **Lunch Break**

Chairman: Filippos Vallianatos

- 15:00 - 16:00: (online) Apostolos Dollas (Technical University of Crete, Chania)
“Observation of Chimera States on Large Scale Cellular Automata Executed on a Reconfigurable Logic-Based Accelerator”
- 16:00 – 17:00: (online) Dimitrios Angelakis (Technical University of Crete, Chania)
“Analog Quantum Simulation and Computation: From Condensed Matter to Quantum Supremacy”
- 17:00 - 17:30: **Coffee Break**
- 17:30 - 18:30: Nikolaos Kalogeropoulos (American University of Iraq-Baghdad)
“Power Law Entropies for Parabolic Dynamical Systems”
- 19.30 - Conference Dinner

Tuesday, July 25

Chairman: Vassilios Constantoudis

9:30 – 10:00: Georgios Koutsokostas (University of Athens)
“Perturbation Theory for Solitons in Nonlocal Media”

10:00 – 10:30: Fotios Oikonomou (University of Patras)
“Alpha Geodesic Distances for Clustering of Shapes”

10:30 – 11:00: Angeliki Thrasyvoulou (University of the Aegean)
“Study of a Nonlocal Epidemiological Model”

11:00 – 11:30: George Zacharakis (ASPETE)
“Animal Activity Recognition Using Deep Learning Methods”.

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

12:00 – 12:30: Athanassios Tzemos (Research Center for Astronomy and Applied Mathematics,
Academy of Athens)
“Introduction to Bohmian Quantum Chaos”

12:30 – 13:00: Konstantina Kyriakoudi (University of Ioannina)
“Magnetic Field Effects on Hemodynamics: Investigating Blood Flow Alterations”

13:00 – 13:30: Constantinos-Pantelis Zois (University of Athens)
“Electronic Structure and Photophysical Properties of Copper Carbene Complexes”

13:30 – 15:00: **Lunch Break**

Chairman: Minos Axenides

15:00 – 15:30: Vasileios Vachtsevanos (University of Thessaloniki)
“Emergence of Topological Defects in an Atomic Ring”

15:30 – 16:30: Ioannis Michaloudis (American University of Cyprus)
“SkyNanoDesign: Space Era Fractal Nanomaterials in Visual Arts and Design”

16:30 - 17:00: **Coffee Break**

17:00 – 18:30: Round Table Discussion II: *“Dynamical Systems and Complexity in Engineering and Technology”*

Wednesday, July 26

Chairman: Vasileios Drakopoulos

9:30 - 10:30: (online) Sotiris-Konstantinou Rizos (Yaroslavl State University)
“N-simplex Maps”

10:30 - 11:30: (online) Pavlos Xenitidis (Liverpool Hope University)
“Discrete Integrable Systems and Symmetries”

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

12:00 - 13:00: Pavlos Kassotakis (University of Warsaw, Poland)
“Matrix Factorizations, Pentagon Maps and Discrete Integrability”

13:00 – 15:00: **Lunch Break**

Chairman: Vassilis Constantoudis

15:00 - 16:00: George Papamikos (University of Essex, UK)
“From Soliton Theory to Discrete Integrable Dynamical Systems”

16:00 - 17:00: Constantinos Valagiannopoulos, (National Technical University of Athens)
“Nonlinear Electromagnetic Twistrionics”

17:00 - 17:30: **Coffee Break**

17:30 – 18:00: Vassilis M. Rothos (Aristotle University of Thessaloniki)
“Solitons in Nonlocal NLS-type systems”

18:00 – 19:00: Conclusions, Closing of the 29th School