TURKISH NONLINEAR SCIENCE

WORKING GROUP

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XII. International Symposium on

"Disorder Systems: Theory and Its Applications"

23 - 30 August 2012

Karaburun - İzmir - Turkey

Sponsors
Celal Bayar University
Karaburun Municipality
Turkish Nonlinear Science Working Group

Programme & Abstract Booklet

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SYMPOSIUM PROGRAMME

23 August 2012 – Thursday

14.00-18.00 Registration
Welcome Meeting and
Assignment Member of Workshops

24 August 2012 – Friday

09.00-11.00 Registration
11.00-13.00 Workshop Meetings
13.00-14.30 Symposium Lunch
15.45-16.00 Opening
16.00-17.00 *"Non-Equilibrium Statistical Mechanics"*
Adrian Baule, *Queen Mary University of London,UK*

17.30-19.00 Mayor of Karaburun Municipality Cocktail

25 August 2012 – Saturday

11.00-13.00 Workshop - I:*"Non-Equilibrium Statistical Mechanics"*
Coordinator: **Adrian Baule,** *Queen Mary University of London, UK*

13.00-14.30 Symposium Lunch

15.00-16.00 *"The Quantum Aspect of Living Systems"*
Haluk Berkmen, *(IAEA)*

16:00-16:30 Coffee break

16.30-17.30 "An Analysis of *Australopithecus Sediba* from a New Viewpoint:
"Mentis Eversionis"
Oktay Kaynak, *Urla, Turkey*

17:30-18:00 Coffee break

18.00-19.00 "*Game Theoretic Prediction of Systems Governed by Pde's"*
Demir Sindel, *İstanbul Technical University, Turkey*

26 August 2012 – Sunday

11.00-13.00 Workshop - II*: "The Quantum Aspect of Living Systems"*
Coordinator: **Haluk Berkmen**, *(IAEA)*

13.00-14.30 Symposium Lunch

15.00-16.00 *"Nonlinear Quantum Systems"*
Hasan Tatlıpınar, *Yıldız Technical University, İstanbul, Turkey*

16.00-16.30 Coffee break

16.30-17.30 *"Quantum Mechanical Solutions Techniques: Some Applications"*
Ramazan Sever, *Middle East Technical University, Ankara, Turkey*

17.30-18.00 Coffee break

18.00-19.00 *"Jamming of Disordered Anisotropic Objects"*
Adrian Baule, *Queen Mary University of London, UK*

20.00- Symposium Party

27 August 2012 - Monday

11.00-13.00 Workshop - III: *"Nonlinear Quantum Systems"*
Coordinator: **Hasan Tatlıpınar**, *Yıldız Technical University, İstanbul Turkey*

13.00-14.30 Symposium Lunch

15.00-16.00 *"The Computerized Psychomotor and the Psychotechnical Tests: Brain Cognitive Function Assessment"*
Necip Kutlu, *Celal Bayar University, Manisa,Turkey*

16.00-16.30 Coffee break

16.30-17.30 *"Pain and Affect as a Non-linear System"*
Gülgün Sengül, *Ege University, İzmir, Turkey*

17.30-19.00 Workshop - IV:*"Complexity in Medicalphysics"*
Coordinator: **Tamer Zeren,** *Celal Bayar University, Manisa, Turkey*

28 August 2012 – Tuesday

11.00-13.00 Workshop - V: *"Quantum Mechanical Solutions Techniques: Some Applications"*
Coordinator: **Ramazan Sever -** *Middle East Technical University, Ankara, Turkey*

13.00-14.30 Symposium Lunch

15.00-17.00 The results of the Workshop Meetings - I

29 August 2012 – Wednesday

Trip - Karaburun Peninsula

20.00-21.00 *"Complexity in Utopia"*
K.Gediz Akdeniz, *İstanbul University, Turkey*

30 August 2012 – Thursday

11.00-13.00 The results of the Workshop Meetings - II
13.00-14.30 Symposium Lunch
14.30-16.30 **Closing Remarks**

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ABSTRACTS

Non-Equilibrium Statistical Mechanics

Adrian Baule
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Many phenomena in our daily life appear away from thermal equilibrium, such as turbulence, earthquakes, and biological processes. Nevertheless, we are just beginning to unravel the basic principles underlying non-equilibrium systems. The main question is whether a universal statistical mechanical theory, which explains the emergent complexity from the interactions of the individual constituents, can be formulated. In this talk I present an overview of recent developments in non-equilibrium statistical mechanics.

The Quantum Aspect of Living Systems

Haluk Berkmen,
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Quantum theory has proven that all existing entities display a particle as well as a wave aspect. These characteristics apply not only to elementary particles and inorganic systems, but also to organic living systems. Both living as well as non living entities abide to the same universal laws. Thus it is quite logical to analyze living systems with the principles and laws of Quantum Mechanics, Statistical Mechanics and Thermodynamics. In this visual presentation the different aspects of living systems will be tentatively explained with the help of the above mentioned physical theories.

Game Theoretic Prediction of Systems Governed by Pde's

Demir Sindel,
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Following work deals with the No_x and So_x discharges due to the combustion of the main and auxiliary engines. Zeldovich 's equations are admitted as the base of pollutants from vessels. The PDE's wave been transformed to SPDE 's studying same additive random density functions. Such equations have been studied via the Lie algebra on PDE's following solver. The extension to SPDE's has been studied via Hamiltonian Dynamics. The Lie algebra associated with difference equations give invariant solutions to the problem at the hand. A differential game problem has been formulated as a differential game whose state equations are given as PDE's and SPDE's. The algorithms for the solutions of generalized HJB differential equations have been given.

An Analysis of *Australopithecus Sediba* from a New Viewpoint: ''Mentis Eversionis

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If we look at Au.sediba with the point of views that are accepted until today, either the point of view has to be changed or the interpretation of organs that are required to be in conjunction with changes.

What implies them to be arboreal is the long arms and the ankles. Being aquatic is related to the heels. The reason of the pelvis shaping, like a bowl and correspondingly the rib cage becoming cylindrical and getting narrower, is the fact of being two footed and having a perpendicular body trunk.
When Au sediba's body trunk has reached enough erectness, the position of the embryo in the womb changed. The embryo of Australopithecus overturning 180o, turned its head towards mother's diaphragm. I call this ''Mentis Eversionis''. This overturning triggered skull (brain) growing. Human embryos correct this overturning in 7. month of pregnancy and are born.
The question should be, "How could the skull volume reach from 420 to 680-750 cc in 77 thousand years, whereas in 3-4 million years the skull volume reaches from 350 to 420 cc? The reason for this extraordinary, fast change is ''Mentis Eversionis''.
Au. sediba is the Rosetta Stone of human evolution. It is a fortune for human evolution. It has to be studied correctly.

Nonlinear Quantum Systems

Hasan Tatlıpınar
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Linear quantum mechanics is one of important theory of physics and according to general point of view it covers the classical physics, it has great successes in new technology and it caused many philosophical explanation of natural and social sciences. But recently a lots of new macroscopic physical observations have no simple explanation in linear quantum mechanics such as superconductivity, superfluity, BEC, quantum entanglement ect. On the other hand macroscopic world shows nonlinear dynamical behavior and there are many efforts to do physical theories for nonlinear dynamical systems. The main aim of this presentation is to discuss nonlinear quantum mechanical systems and look how is possible to construct nonlinear quantum mechanics theory.

Quantum Mechanical Solutions Techniques: Some Applications

Ramazan Sever
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Quantum mechanical techniques used in the exact solution of Schrodinger, Klein-Gordon and Dirac equations are discussed. Some well known potentials are solved as an application. The energy eigenvalues and corresponding wave functions are obtained. Scattering problem is also studied. A general approach on the use of Nikiforov-Uvarov method is introduced. The constant and position dependent mass cases are also discussed.

Jamming of Disordered Anisotropic Objects

Adrian Baule
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Random packings of elongated anisotropic objects can reach higher packing fractions than 64%, which is the random close packing fraction of spheres. The behaviour of the packing fraction as a function of the objects' aspect ratio is usually non-monotonic and exhibits a peak at an aspect ratio of around 1.4. In this talk a theory for jammed anisotropic objects based on a statistical description of the Voronoi volume is presented.

The Computerized Psychomotor and the Psychotechnical Tests: Cognitive Function Assessment

Necip Kutlu,
Celal Bayar University, Manisa, Turkey
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Psychotechnical and Psychomotor Tests stands for increased efficiency in the training of cognitive abilities. This technically advanced software package is our response to the demand from therapists for a training system which takes account of modern psychological insights and which, by means of training programs that simulate real-life situations, helps clients to integrate their progress into everyday life.

Cognitive function tests are an intelligent, interactive system which reliably identifies your ability level and automatically adapts to it. This ensures that one of the central requirements of any successful training program is met: the users of the program are motivated.

This Vienna test system; academics, young people, athletes who want to have a profession, talents and determination, can be used as more accurate than traditional methods.

Pain and Affect as a Nonlinear System

Gülgün Şengül
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Pain is a cognitive, sensory, and emotional experience and a motivational and interactional force. A simple pain usually has a clear, single cause and can be framed within a stimulus-response model where the traditional mechanistic, deterministic model based on specificity, intensity, pattern and gate-control-theory is suitable. In contrast, complex pain states have a multifactorial origin. The link between stimulus and pain experience is linear in the case of simple pain, whereas in complex pain conditions there are multiple associations among elements, between which there may be nonlinear and nondeterministic relations. A non-deterministic, non-linear, multidimensional pain concept for complex regional pain has been proposed by Wörz (2001).

Simple versus complex pain states (Wörz, 2003)

Simple pain	**Complex pain**
Monocausal	Multifactorial
Unidirectional	Bidirectional
Stimulus-response	Interactions
Linear	Nonlinear
Causal sequence	Network
Deterministic	Nondeterministic

The terms “causal sequence” and “network” constitute the fundamental differences between simple and complex pain states. Pain in depression and depression in pain will be discussed as an example of complex pain states where the complexity theory is a more appropriate conceptual framework than conventional models of nociception.

References

Wörz R. [Multidimensional, nonlinear pain concept. A broad approach for explaining and understanding complex pain syndromes]. Fortschr Med Orig. 2001 Nov 29; 119(3-4):129-33.
Wörz R. Pain in depression, depression in pain. Pain (IASP), 2003, 11 (5): 1-4,
Young G, Chapman CR, Chronic pain and affect as a nonlinear dynamical system.In: Young G, Nicholson K, Kane AW. Psychological Knowledge in Court. PTSD, Pain and TBI. Springer, 2006, Section 3, 181-192.

Complexity in Utopia

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Recently I proposed “Complex Utopia” with disordered simulation correlations to lead us new ways instead of modern utopia (Thomas More Utopia). And more recently I have critiqued the Heterodox Dervish (tasavvuf) activities between 14-18 centuries, mostly in Anatolia&Balkan as a Complex Utopia example.

In this talk I reconsider shortly Complex Utopia with Heterodox example. And I will discuss Complexity in Utopia in the context of a commutarianist movements in Cairo and Athens in particular.

WORKSHOPS

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