



22<sup>nd</sup> International Summer School - Conference

**NONLINEAR SCIENCE AND COMPLEXITY**

*House of Science, Patras, July 15 – 24, 2009*  
*International Center of Nonlinear Dynamics and Complex*  
*Systems, Pescara, July 28 – 31, 2009*

## **LECTURE PROGRAM**

*Sponsored by:*

Ministry of Education of Greece, University of Patras, University of Chieti – Pescara

*organized by:*

**UNIVERSITY OF PATRAS AND**  
**INTERNATIONAL CENTER OF NONLINEAR DYNAMICS**  
**AND COMPLEX SYSTEMS**  
**UNIVERSITY OF CHIETI - PESCARA**

<http://www.math.upatras.gr/~crans> , <http://limnos.chem.demokritos.gr/cosa>

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## WEDNESDAY, 15 JULY

*Chairmen: Sp. Pnevmatikos and T. Bountis*

### Morning Session: 09:30 – 13:30

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- 09:30 – 10:30 **Registration – Greetings – Introductory Remarks**  
Sp. Pnevmatikos (Patras), T. Bountis (Patras)
- 10:30 – 11:30 **Centers of Science: A New Approach to Education**  
A. Mavromatis (Chalkis)
- 11:30 – 12:00 *Coffee Break*
- 12:00 – 13:00 **Mathematical Foundations of Dynamical Systems 1**  
Sp. Pnevmatikos (Patras)

### Afternoon Session: 15:00 – 17:00

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- 15:00 – 16:00 **Introduction to Hamiltonian Systems 1**  
T. Bountis (Patras)
- 16:00 – 17:00 **Patras Center of Science: An Introductory Presentation**  
A. Mavromatis and Team of Instructors of the Center (Patras)
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## THURSDAY, 16 JULY

*Chairman: A. Mavromatis*

### Morning Session: 09:30 – 13:00

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- 09:30 – 10:30 **Introduction to Hamiltonian Systems 2**  
T. Bountis (Patras)
- 10:30 – 11:30 **Mathematical Foundations of Dynamical Systems 2**  
Sp. Pnevmatikos (Patras)
- 11:30 – 12:00 *Coffee Break*
- 12:00 – 13:00 **Nonlinear Oscillations and Bifurcation Theory 1**  
J. P. van der Weele (Patras)

### Afternoon Session: 15:00 – 17:00

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- 15:00 – 15:30 **An Introduction to Gauss Integration and Spline Functions**  
N. Pnevmatikos (Paris)
- 15:30 – 16:00 **An Introduction to Game Theory and Nash Equilibria**  
K. Andriopoulos (Patras)
- 16:00 – 17:00 **Coffee/Discussion Sessions**
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## FRIDAY, 17 JULY

*Chairwoman: L. Vlahos*

### Morning Session: 09:00 – 13:00

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- 09:30 – 10:30 **Nonlinear Oscillations and Bifurcation Theory 2**  
J. P. van der Weele (Patras)

- 10:30 – 11:30 *Introduction to Hamiltonian Systems 3*  
T. Bountis (Patras)
- 11:30 – 12:00 *Coffee Break*
- 12:00 – 13:00 *Mathematical Foundations of Dynamical Systems 3*  
Sp. Pnevmatikos (Patras)

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**Afternoon Session: 15:00 – 17:00**

- 15:00 – 16:00 *Stability in Hamiltonian Systems and the Fermi Pasta Ulam Problem*  
C. Efthymiopoulos (Athens)
- 16:00 – 17:00 **Coffee/Discussion Sessions**
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**SATURDAY, 18 JULY**

*Chairman: T. Bountis*

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**Morning Session: 09:30 – 13:00**

- 09:30 – 10:30 *Nonlinear Oscillations and Bifurcation Theory 3*  
J. P. van der Weele (Patras)
- 10:30 – 11:30 *Introduction to the Physics of Plasmas and its Applications 1*  
L. Vlahos (Thessaloniki)
- 11:30 – 12:00 *Coffee Break*
- 12:00 – 13:00 *Introduction to the Physics of Plasmas and its Applications 2*  
L. Vlahos (Thessaloniki)

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**Afternoon Session: 15:00 – 17:00**

- 15:00 – 16:00 *Introduction to the Physics of Plasmas and its Applications 3*  
L. Vlahos (Thessaloniki)
- 16:00 – 17:00 **Coffee/Discussion Sessions**
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**SUNDAY, 19 JULY**

**EXCURSION for sight seeing and swimming**

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**MONDAY, 20 JULY**

*Chairman: A. Provata*

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**Morning Session: 09:30 – 13:00**

- 09:30 – 10:30 *Introduction to Nonlinear Optics 1*  
K. Hizanidis (Athens)
- 10:30 – 11:30 *Introduction to Nonlinear Optics 2*  
K. Hizanidis (Athens)
- 11:30 – 12:00 *Coffee Break*
- 12:00 – 13:00 *Introduction to Nonlinear Optics 3*

K. Hizanidis (Athens)

**Afternoon Session: 15:00 – 17:00**

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15:00 – 16:00 *Fundamental Applications of Nonlinear Optics*  
Y. Komini (Athens)

16:00 – 17:00 *Coffee/Discussion Sessions*

**TUESDAY, 21 JULY**

*Chairman: K. Hizanidis*

**Morning Session: 09:30 – 13:00**

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09:30 – 10:30 *Introduction to Celestial Mechanics 1*  
H. Varvoglis (Thessaloniki)

10:30 – 11:30 *Introduction to Celestial Mechanics 2*  
H. Varvoglis (Thessaloniki)

11:30 – 12:00 *Coffee Break*

12:00 – 13:00 *Pattern Formation in Chemistry and Biology 1*  
A. Provata (Athens)

**Afternoon Session: 15:00 – 17:00**

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15:00 – 16:00 *Nonlinear Dynamics of the Cardiovascular and Neural System 1*  
A. Bezerianos (Patras) and D. Manoussaki (Nashville)

16:00 – 17:00 *Coffee/Discussion sessions*

**WEDNESDAY, 22 JULY**

*Chairman: H. Varvoglis*

**Morning Session: 09:30 – 13:00**

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9:30 – 10:30 *Nonlinear Dynamics and Statistical Mechanics 1*  
G. Tsironis (Heraclion)

10:30 – 11:30 *Nonlinear Dynamics and Statistical Mechanics 2*  
G. Tsironis (Heraclion)

11:30 – 12:00 *Coffee Break*

12:00 – 13:00 *Nonlinear Dynamics and Statistical Mechanics 3*  
G. Tsironis (Heraclion)

**FREE AFTERNOON**

**THURSDAY, 23 JULY**

*Chairman: A. Mavromatis*

**Morning Session: 09:30 – 13:00**

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09:30 – 10:30 *Pattern Formation in Chemistry and Biology 2*  
A. Provata (Athens)

10:30 – 11:30 *Nonlinear Dynamics of the Cardiovascular and Neural System 2*

A. Bezerianos (Patras) and D. Manoussaki (Nashville)

11:30 – 12:00 *Coffee Break*

12:00 – 13:00 *Pattern Formation in Chemistry and Biology 3*

A. Provata (Athens)

**Afternoon Session: 15:00 – 17:00**

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15:00 – 16:00 *Nonlinear Dynamics of the Cardiovascular and Neural System 3*

A. Bezerianos (Patras) and D. Manoussaki (Nashville)

16:00 – 17:00 **Coffee/Discussion sessions**

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**FRIDAY, 24 JULY**

*Chairmen: T. Bountis and Sp. Pnevmatikos*

**Morning Session: 09:30 – 13:00**

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09:30 – 10:30 *Examination of participating students*

10:30 – 11:30 *Discussion of the results of the Summer School*

11:30 – 12:00 *Coffee Break*

12:00 – 13:00 *Announcement of the results of the examination*

**Afternoon Session: 15:00 – 17:00**

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**FREE AFTERNOON**

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**SUNDAY, 26 JULY**

**DEPARTURE FOR THE CONFERENCE AT  
PESCARA, ITALY, 28 – 31 JULY**

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