
CAMTP

”Let’s Face Chaos through Nonlinear Dynamics”

8th International

Summer School/Conference

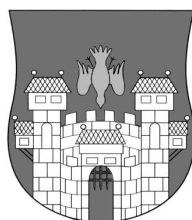


at the University of Maribor

26 June - 10 July 2011

Dedicated to the 65th Birthday of Professor Predrag Cvitanović

Maribor



Slovenia

CAMTP

Center for Applied Mathematics and Theoretical Physics

Univerza v Mariboru • University of Maribor

Krekova 2 • SI-2000 Maribor • Slovenia

Phone +(386) (2) 2355 350 and 2355 351 • Fax +(386) (2) 2355 360

e-mail Robnik@uni-mb.si • <http://www.camtp.uni-mb.si>

Director: Prof.Dr. Marko Robnik

The Supporting Scientific Institution of

The 8th International Summer School/Conference

”Let’s Face Chaos through Nonlinear Dynamics”

University of Maribor, Maribor, Slovenia

26 June - 10 July 2011

e-mail chaos@uni-mb.si • <http://www.uni-mb.si/chaos/2011/>

The mailing and contact address otherwise as for **CAMTP** above

thanks the Patron and the General Sponsor



SLOVENIAN RESEARCH AGENCY



REPUBLIC OF SLOVENIA

**MINISTRY OF HIGHER EDUCATION, SCIENCE AND
TECHNOLOGY**

Tivolska cesta 30

1000 Ljubljana

SLOVENIA

THE ORGANIZING COMMITTEE

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Marko Robnik (CAMTP, Maribor, Slovenia)

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Valery Romanovski (CAMTP, Maribor, Slovenia)

Andreas Ruffing (Munich, Germany)

Aneta Stefanovska (Lancaster, England, UK)

INVITED LECTURERS AND SPEAKERS

all confirmed

Professor Dr. Yoji Aizawa

Waseda University, Tokyo
Japan

Professor Dr. Tassos Bountis

University of Patras
Greece

Professor Dr. Joachim Burgdörfer

Vienna University of Technology
Austria

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Università degli Studi dell' Insubria, Como
Italy

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University of Pennsylvania, Philadelphia
USA

Professor Dr. Predrag Cvitanović

Georgia Institute of Technology, Atlanta
USA

Professor Dr. Hiroaki Daido

Osaka Prefecture University
Japan

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University of Vienna
Austria

Professor Dr. Sergej Flach

Max Planck Institute for the Physics of
Complex Systems, Dresden
Germany

Professor Dr. Theo Geisel

Max-Planck-Institute for Dynamics and
Self-Organization and Physics Department,
University of Göttingen
Germany

Professor Dr. Thomas Gilbert

Université Libre de Bruxelles
Belgium

Professor Dr. Siegfried Großmann

University of Marburg
Germany

Professor Dr. Thomas Guhr

University of Essen-Duisburg
Germany

Professor Dr. Fritz Haake

University of Essen-Duisburg,
Germany

Professor Dr. Hermann Haken

University of Stuttgart
Germany

Professor Dr. Maoan Han

Shanghai Normal University
China

Dr. Takahisa Harayama

NTT, Kyoto
Japan

Professor Dr. Roland Ketzmerick

Technical University of Dresden
Germany

Professor Dr. Dean Korošak

CAMTP, University of Maribor
Slovenia

Professor Dr. George Krylov

Belarus State University, Minsk
Belarus

Professor Dr. Detlef Lohse
University of Twente, Enschede
The Netherlands

Professor Dr. Marko Marhl
FNM and CAMTP, University of Maribor
Slovenia

Professor Dr. Mitsugu Matsushita
Chuo University, Tokyo
Japan

Professor Dr. Peter V.E. McClintock
Lancaster University
UK

Professor Dr. Erik Mosekilde
The Technical University of Denmark, Lyngby
Denmark

Professor Dr. Takao Ohta
University of Kyoto
Japan

Professor Dr. Tomaž Prosen
University of Ljubljana
Slovenia

Professor Dr. Dušan Repovš
University of Ljubljana
Slovenia

Professor Dr. Klaus Richter
University of Regensburg
Germany

Professor Dr. Peter Richter
University of Bremen
Germany

Professor Dr. Marko Robnik
CAMTP, University of Maribor
Slovenia

Professor Dr. Valery Romanovski
CAMTP, University of Maribor
Slovenia

Professor Dr. Andreas Ruffing
Munich University of Technology
Germany

Professor Dr. Akira Shudo
Tokyo Metropolitan University
Japan

Professor Dr. Sara A. Solla
Northwestern University, Evanston
USA

Professor Dr. Aneta Stefanovska
Lancaster University
UK

Professor Dr. Hans-Jürgen Stöckmann
University of Marburg
Germany

Professor Dr. Kazuo Takatsuka
University of Tokyo
Japan

Professor Dr. Peter Tass
Research Center Jülich
Germany

Professor Dr. Mikito Toda
Nara Women's University
Japan

Professor Dr. Hans A. Weidenmüller
Max-Planck-Institute for Nuclear Physics,
Heidelberg
Germany

Professor Dr. Michael Wilkinson
Open University, Milton Keynes
UK

Professor Dr. Guenter Wunner
University of Stuttgart
Germany

Professor Dr. Weinian Zhang
Sichuan University, Chengdu
China

THE SCIENTIFIC PROGRAMME

INTRODUCTION AND THEORETICAL BACKGROUND

Synergetic approach to self-organizing systems
Discrete versus continuous representation of dynamical systems
Mathematical background
Physical background
Classical and quantum Hamiltonian systems
Dissipative systems
Ergodic theory
Open systems
Information dynamics
Fractal structures - geometry of chaos
Quantum aspects of classical chaotic systems (quantum chaos)
Qualitative and quantitative analysis of time series
Modelling and simulation of system dynamics
Qualitative modelling - problems and perspectives

SCIENTIFIC DISCIPLINES

Physics and Mathematics

Classical Hamiltonian nonlinear dynamics
Chaos in celestial mechanics and stellar dynamics
Chaos in the Solar System dynamics
Dynamics of dissipative systems
Fluid dynamics: Theory of turbulence
Cellular automata
Quantum physics: Quantum chaos
Atomic and molecular physics
Semiclassical mechanics
Periodic orbit theory (Gutzwiller approach)
Random matrix theories
Mesoscopic systems (microstructures, quantum dots)
Microwave cavities and wave chaos

Engineering

Structural and dynamical stability
Control of chaos in mechanical systems
Electrical circuits
Neural networks and neural computers
Chemical reactions
Mesoscopic solid state systems

Biophysics and Physiology

EEG
Brain functioning
ECG
Blood flow (revealing oscillators)
Modelling of complex biological and physiological systems
Turing structures
Pattern formation

Economy

Econophysics
Evolutionary economics, macroeconomic cycles
Stock market dynamics
Financial systems
Sociological aspects of economical structures and developments

FOREWORD, SOME HISTORY AND PURPOSE

Chaos, either classical or quantum, conservative or dissipative, pure or applied, has become a fashionable subject of pronounced activities of nonlinear science during the recent decades. It is attracting the attention of not merely scientists in the relevant and related multidisciplinary and interdisciplinary scientific fields but even of philosophers or writers, coming up in daily papers and popular magazines. It often gives rise to turbulent controversies and disputes concerning its scientific merit and its practical use. Today, this field of research is very well established, it is immensely important in both pure science and in technology, and in fact might be considered as one of the scientific revolutions of 20th Century, extending its fast development into the 21st Century. It has a great and very important future for many centuries to come. In broader sense, it simply encompasses the totality of complex systems in nature, technology and society.

In August 1992, a group of students at the University of Ljubljana, led by the initiator Mrs. Maja Malus, came up with the idea to organize a summer school covering the variety of topics in pure and applied research on chaos. The main organizational effort was undertaken by the voluntary student staff under the direction of Maja Malus, then undergraduate student of electrical engineering at the University of Ljubljana and with active support of the international student association IAESTE. The scientific advisory board of the School (Professors Igor Grabec, Marko Robnik and Aneta Stefanovska) set up in March 1993, enjoyed the enthusiasm of the students, their devotion and hard work which eventually resulted in a very successful meeting. Financial support of many Slovenian sponsoring and donating companies and institutions, especially IBM Slovenia and the Ministry of Science and Technology, was highly appreciated and acknowledged. The hard and enthusiastic work of the student staff, the technical organizer of the School, was crowned with the prestigious charter and the golden tablet of the University of Ljubljana, for the *"...exceptional achievements in organizing the International Summer School..."*.

The Summer School has become a tradition now: The second School was held at the University of Ljubljana in August 1994 (one week), and the third one on 24 June - 5 July 1996 at the University of Maribor, as a part of the activities of CAMTP. The 4th School/Conference held at CAMTP, University of Maribor, on 27 June - 11 July 1999 was again very successful indeed, for we had 37 invited lecturers from all over the world, from all continents, and in total about 105 participants. The fifth School/Conference, held traditionally at CAMTP on 30 June - 14 July 2002, was even stronger, as we had 40 invited lecturers and speakers from all over the World, and altogether about 130 participants. In 2005 we had 46 invited lecturers and 68 other participants, and in 2008 again 46 invited lecturers and 38 other participants. All Schools were strongly international, in the sense that about 90% of all participants (lecturers and "students") were from abroad. The lecturers, about twelve in 1993 and 1994, and about 27 in 1996, 37 in 1999, 40 in 2002, 46 in 2005 and again in 2008 were from among the leading scientists in the relevant scientific disciplines, from many countries worldwide, including USA, Canada, Russia, Japan, Western Europe, Israel, etc. The School was intellectually dignified by the attendance and the lectures of such distinguished scientific scholars as Professor Boris Chirikov from Novosibirsk, Russia, Professor Siegfried Großmann from Marburg, Germany, Professor Giulio Casati from Como, Italy, Professor Erik Mosekilde from Lyngby, Denmark, Professor Uzy Smilansky from Rehovot, Israel, Professor Hermann Haken from Stuttgart, Germany, Professor Predrag Cvitanović from Atlanta, USA, Professor Oriol Bohigas from Orsay, France, Professor Giovanni Gallavotti from Rome, Italy, Professor George Contopoulos from Athens, Greece, Professor Yoshiki Kuramoto, Kyoto, Japan, Professor Yoji Aizawa from Tokyo, Japan, Professor Tassos Bountis from Patras, Greece, Professor Theo Geisel from Göttingen, Germany, Professor Pierre Gaspard from Brussels, Belgium, Professor Hans A. Weidenmüller from Heidelberg, Germany, and many others.

It should be mentioned that since 2002 we have the tradition that the Summer School & Conference is dedicated to some prominent physicists, namely: Hermann Haken in 2002 on occasion of his 75th birthday, Siegfried Grossmann in 2005 on occasion of his 75th birthday, and Giulio Casati in 2008 on occasion of his 65th birthday. This year, in 2011, it is dedicated to Professor Predrag Cvitanović on occasion of his 65th birthday. More about that please see on page 11.

Therefore our 8th International Summer School/Conference "Let's Face Chaos through Nonlinear Dynamics" is a natural continuation of this tradition, again in the same environment as in 2008, 2005, 2002, 1999 and 1996, namely at the University of Maribor, as one of the activities carried out by CAMTP, in the period 26 June through 10 July 2011. This environment proved indeed to be ideal for such purposes for many reasons, including the rich cultural life offered by the marvelous performances on the world top level of the Maribor Festival Lent, the sportific facilities, the mountains and hiking there, the excellent local Slovenian wines and wine tasting tour, the touristic attractions, our excellent private concerts performed by our young Slovenian musicians, exhibitions of fine arts, excursions through Slovenia, fireworks that accompany the closing of the Festival Lent, etc. This time we shall again enjoy some very interesting public evening lectures. One of them will be delivered by Professor Mrs. Sara A. Solla of Northwestern University, Evanston, USA, on Monday 4 July 2011 at 21:00, about the neurosciences.

The scientific programme is covering the broad interdisciplinary and multidisciplinary field of nonlinear dynamics and synergetics, concerning applications and manifestations of chaos in diverse fields of human knowledge, ranging from mathematics to physics and chemistry, from medicine to economy, from biology to engineering, and includes even sociological aspects. It seems natural for us to speak about chaos versus order in an interdisciplinary context. The organizers of this School/Conference share the belief that interdisciplinary trends and developments in science are of primary importance, especially in order to counteract the strongly increasing specialization taking place in the science and technology in our most modern era, however certainly not at the expense of the quality of the disciplinary research: In order to achieve strong interdisciplinarity we certainly need in the first place strong disciplinarity. There is an obvious and urgent need for meetings of this kind, giving an opportunity of scientific exchange among seemingly distant disciplines, and, most of all, allowing students and junior scientists to better understand the role of interdisciplinary research, and to bring them in touch with science in making. And to offer them the opportunity to present their own research work (in short reports and posters). To promote most talented young people from all over the world.

It should be emphasized that the physics of complex systems, nonlinear dynamics and synergetics are surely one of the major branches of science and research in the 21st Century, along with elementary particles, astrophysics, biophysics, molecular biology, genetics, medicine, economy, psychology, sociology, new technologies like nanotechnologies, almost all of which are in fact also to some considerable extent the area where the nonlinear dynamics is applicable in an important way. As such the nonlinear dynamics paves the way of future science and technology of complex systems in the 21st Century.

The level at the beginning of each lecture course (delivered by invited lecturers as a series of one-hour (60 minutes) lectures) will be adapted to the advanced undergraduate students (3rd and 4th year) and graduate students (most of the students usually are Ph.D. students (research students) and junior postdocs), but there are also many senior postdocs, junior scientists/professors and senior scientists/professors, whilst in closing the series of lectures (the last

third or so) may be and typically will be at the conference level, containing the most recent results comprehensible for the majority of the audience and subject to the discussion among the attending invited speakers, experts and specialists.

The structure of the School & Conference this year will be slightly changed as follows.

In the first week we shall have mainly school programme consisting of five 5-hours lecture courses (each hour 60 minutes):

1. **Predrag Cvitanović, Atlanta, USA:** *Fluid dynamics and turbulence*
2. **Thomas Guhr, Duisburg-Essen, Germany:** *Econophysics*
3. **Tomaž Prosen, Ljubljana, Slovenia:** *Nonequilibrium classical and quantum statistical mechanics*
4. **Aneta Stefanovska, Lancaster, England:** *Nonlinear dynamics of life: nonautonomous systems, biological oscillators, cellular, cardiovascular and brain dynamics and interactions*
5. **Hans-Jürgen Stöckmann, Marburg, Germany:** *Quantum chaos and random matrix theories*

Nevertheless, there will be also some conference presentations and/or short two-hours lecture courses.

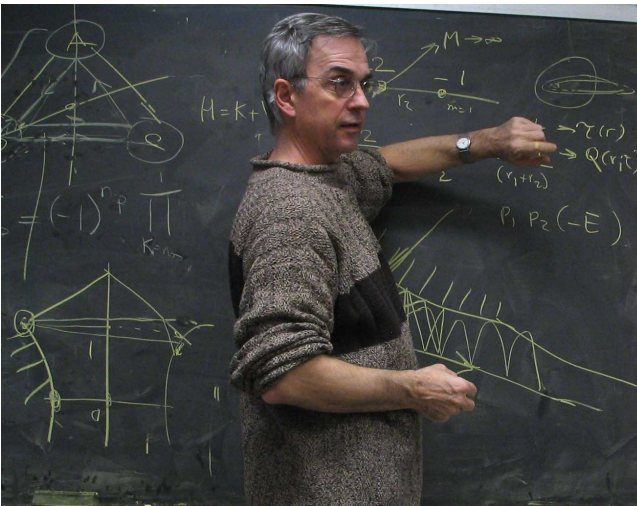
In the second week we shall have mainly the conference programme, but nevertheless the lectures will still be at the colloquium level, thus including a good introduction for the nonspecialists and general physics audience. There might be also a few additional mini lecture courses (2 hours each).

The session for short reports (contributed talks) presented by the participants will be mainly on Saturday 2 July 2011 in the morning until lunch time. The posters will be on display during the entire period of the School/Conference, that is two weeks.

**The 8th School/Conference Is Dedicated to the
65th Birthday of Professor Predrag Cvitanović
of the Georgia Institute of Technology, Atlanta, USA**



Professor Predrag Cvitanović



Professor Predrag Cvitanović is one of the five Honorary Directors of our Schools & Conferences, and one of the most outstanding invited lecturers since 1999. He is one of the pioneers of classical and quantum chaos, but his scientific opus is wider than that, as he has been actively and successfully working in the quantum field theory, group theory from the point of view of a theoretical physicist, especially applied in the QCD, fluid dynamics and turbulence, and nonlinear classical field theories. He describes himself "not merely as a nonlinear dynamicist, but as a theorist with theoretical and mathematical physics interests in quantum theory, statistical mechanics, dynamical systems theory and computational physics. The actual work spans such seemingly disparate topics as applications of group theory to particle physics, study of topology of hyperbolic flows, or advising experimentalists on analysis of their data". One of his outstanding contributions is his formulation of the universal equation for the period doubling (Feigenbaum 1978 and 1979 papers), which has since then played also a key role in the theory of transition to turbulence. His numerous fundamental papers are classical research papers and have influenced the development of classical and quantum chaos, as well as turbulence theory.

Predrag Cvitanović's contributions to the foundations of nonlinear dynamics span a broad range of physical problems, from renormalization in transitions to chaos to periodic orbit theory of quantum systems to dynamical theory of hydrodynamical turbulence.

In 1976 he derived in collaboration with M.J. Feigenbaum the universal equation for period doubling. In order to describe the topological structure of "strange attractors" of Henon type, he introduced the notion of pruning front, still actively investigated by both physicists and mathematicians. Cvitanović's highly cited contributions to nonlinear dynamics include introduction of "cycle expansions" and their applications to semiclassical quantization, "wave chaos" in acoustics, symmetry decomposition of dynamical zeta functions, and discovery of phase transitions on "strange sets". Recently he has worked towards a periodic orbit theory of spatiotemporal turbulence of infinite dimensional dynamical systems such as boundary shear flows.

Other frequently cited contributions include T. Kinoshita and P.C. calculation of the sixth-order magnetic moment of the electron, his group theory for Feynman diagrams in non-Abelian gauge theories, his "Magic Triangle" for exceptional Lie algebras, and his planar field theory.

Cvitanović is also known for his monographs/webbooks on Field Theory, Group Theory, and Chaos.

Professor Predrag Cvitanović is not only influential in the scientific research community and in the organization of science worldwide, but also - very importantly - always promotes young scientists all over the world. Many of them had the lucky chance to be his PhD students or postdocs, either in Atlanta, or formerly in Chicago and Copenhagen. His generosity is well known, and he has been also a donator of CAMTP as early as in 1999, helping us build up our institute's library. It is crucial to point out that his life opus is by no means concluded, on the contrary, he keeps on working with great intensity and we are happy to have the opportunity at this School and Conference to listen to his lectures on the fluid dynamics and turbulence (a 5-hours lecture course) and also to follow his account of the most recent results.

We are looking forward to honour him in Maribor, on occasion of his 65th birthday, combining wonderful science with wonderful music. All this happening will be taking place not so far from his beautiful home country, Croatia, our neighbour and friend.

THE PARTICIPANTS

The participants whom we encourage to apply and to attend are:

- **advanced undergraduate students**
- **graduate students (Ph.D. students, research students)**
- **junior and senior postdoctoral students**
- **junior scientists/professors**
- **senior scientists/professors**

If you are interested in the scientific topics of our School/Conference, if you are already studying some issues in this field, or if you are even working in the field, or if you are expert in one aspect of the interdisciplinary field of nonlinear dynamics and synergetics, but wish to learn more about the other aspects and other branches of this vast and important field of research, then you are welcome to apply to attend. Please follow the instructions below and observe the deadlines.

THE SCIENTIFIC COMMUNICATIONS

If you already work in the field, you might have the opportunity to present your work and your results as a **communication**, namely either as a **poster** or as a **short report**. Each participant can present either up to two posters, or one poster and one short report, or just one poster, or just one short report, or no communication at all. A poster can have typical dimensions of 100 cm x 150 cm. The display/exhibition of the posters will last for the entire period of the School/Conference, that is two weeks, and there will be two halls (Dvorana Antona Trstenjaka and Dvorana Borisa Podrecca) devoted to the poster exhibition in the Main University Building, just next to the main lecture hall (**Velika dvorana**). There (in the Halls Anton Trstenjak and Boris Podrecca) we shall serve tea and coffee in the breaks so that the interactions and discussions around the posters will be extremely intense, effective and long-lasting. Therefore the presentation of posters is strongly encouraged and recommended.

A short report (seminar) can be maximally 20 minutes long. Both types of contributions are subject to the refereeing procedure and the acceptance by the Organizing Committee. The category of communication, the title and the abstract, including some key references, should be stated in the electronic Application form, about roughly half A4 page per communication. If you want to increase the visibility of your scientific communications and their assessment then we advise you to include your C.V. and the list of publications in your submission of the Application form. The Application form is available in plain ascii format at the conference home page <http://www.uni-mb.si/chaos/2011/>. This must be filled in and mailed to the e-mail address chaos@uni-mb.si. **The deadline** for this type of application is **Friday 20 May 2011**.

The selection will be quite strong and only a limited number of communications will be accepted (about 20 short reports, and about 40-60 posters). Again, it should be emphasized that the posters will be displayed during the full period of the School/Conference (two weeks), which is a very important advantage in favour of the authors, allowing them a thorough presentation and discussion with the interested persons, especially during the coffee breaks, in the mornings and in the evenings. Therefore there will be no special poster session (time interval).

Subject to the willingness of our sponsors **we shall** make arrangements to **award a few of the most outstanding works. The awards will be worth about up to 500.-EUR each.**

THE PROCEEDINGS OF THE SCHOOL/CONFERENCE

The accepted (selected) and presented communications of the participants will be published together with the lectures of the invited lecturers and speakers in the Proceedings of the School/Conference. The organizing committee plans again, like in 1999/2000, 2002/2003, 2005/2006 and 2008 to publish the Proceedings. This time in a special volume of the American Institute of Physics Conference Proceedings, like in 2008. The deadline for submission of the articles (typescripts) will be 30 September 2011, and the publication date will be before the end of the year 2011. The Proceedings will have about 600 pages in total, and should be printed and distributed worldwide. The interested persons can have a look at the Proceedings of the 4th and 5th School/Conference published in special volumes of the *Progress in Theoretical Physics Supplements (Kyoto) Vol. 139, 2000, Editors M. Robnik, Y. Aizawa, H. Hasegawa and Y. Kuramoto*, and *Vol. 150, 2003 Editors M. Robnik, Y. Aizawa, and Y. Kuramoto*, to see the typical structure and contents of our Proceedings. The Proceedings of the 6th School/Conference were published in 4 issues of the journal *Nonlinear Phenomena in Complex Systems*, Vol. 9, No. 2-3, 2006, Vol. 10, No. 1-2, 2007. The Proceedings of the 7th School & Conference are *AIP Conference Proceeding*, Vol. 1076: Proceedings of "Let's Face Chaos Through Nonlinear Dynamics" 7th International Summer School and Conference, Eds. M. Robnik and V.G. Romanovski. The publications there have a status of a regular refereed article.

FINANCIAL SUPPORT FOR PARTICIPANTS

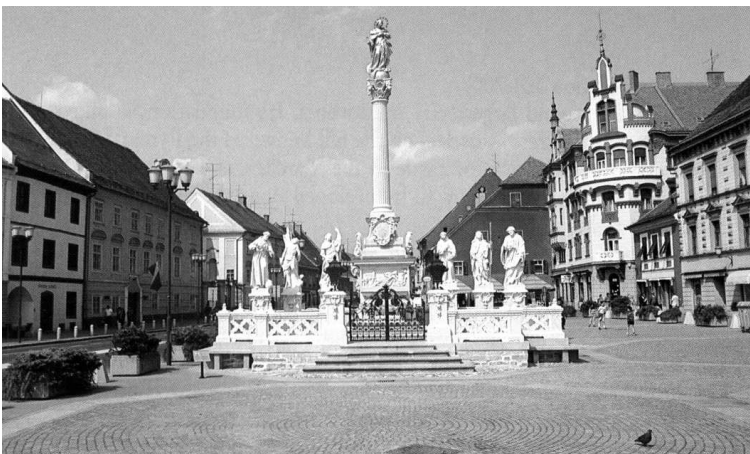
There will be available some very limited financial support for most highly qualified participants (mainly from the economically weak countries) by various funding institutions, e.g. by the European Physical Society and by the Ministry of Higher Education, Science and Technology of the Republic of Slovenia, especially for participants from the Eastern European (former socialistic) countries (in transition) and developing countries. Excluded are countries of European Union, other countries of Western Europe (like Switzerland), USA, Canada, Australia, Japan, Hong Kong, Singapore, New Zealand, Israel, etc. To apply please register normally (by sending e-mail) like all other participants including sending the advance payment of 600.-EUR and enclose your C.V. and the list of publications. Two letters of recommendation should be sent directly to the e-mail address **chaos@uni-mb.si**. As for this advance payment: Please make a bank transfer to the account of the Summer School/Conference given below. Make sure that all bank transaction expenses are paid on your side, so that the amount will arrive in total (no bank charges upon the receipt). But in every case please send the proof of the payment, namely a faxed copy of transfer to the fax number **+(386) (2) 2355 360**. **The deadline** for applying for financial support is **Friday 22 April 2011**. The candidates will be notified at latest by **Friday 20 May 2011** about what financial support has been approved. If the support is 100% then they will be reimbursed the advance payment of 600.-EUR upon their arrival and registration in Maribor, normally on Sunday 26 June 2011.

THE CULTURAL, TOURISTIC AND SOCIAL EVENTS

During the whole period of the School/Conference there will be **the International Maribor Summer Festival "Lent 2011"**, each evening offering at least four to five cultural events (performances), among which you can freely choose, including theatre, opera & ballet, symphonic and chamber music concerts, jazz performances, folkloristic festival performed by groups from all over the world, etc... The quality level is substantial, some of the best artists in the world come to Maribor, especially in the domain of jazz. For example, in 1996 we even had Ray Charles. And much more. All performances are taking place either at various open air places/squares in the old medieval part of the town, called "Lent", by the river Drava, or inside some historic buildings in the same city quarter, or in the opera, theatre or other concert halls in the city. The entrance is free for our participants (it is fully covered by the participation fee), and the entrance tickets (cards) will be distributed together with other conference materials upon your arrival in Maribor. Reservations, if necessary, can be made (in block) for the interested persons by the assisting staff to the Conference (registration desks). The detailed programme (programme brochure) of the Festival performances will be available and distributed upon your arrival in Maribor. The entrance card is the entrance ticket for almost all performances, only for some exceptional events there is a certain but small surcharge. Also, upon your arrival, together with the conference materials, you will receive the book "Facts about Slovenia", to guide you through our country. We shall also have five private concerts and other nice social events, and a number of public evening lectures by some eminent thinkers, scientists, philosophers, and engineers.

On Saturday morning, 2 July 2011, we shall have the presentations of the short reports, until lunch time. Then, on the same Saturday afternoon, 2 July 2011, after lunch, there will be a tour through the city of Maribor followed by a wine tasting of some best Slovenian wines in Maribor. On the same Saturday evening there will be the banquet and the closing festivity of the folkloristic part of the Festival "Lent 2011", accompanied by a big firework performance starting at 23:45 and lasting until 00:15.

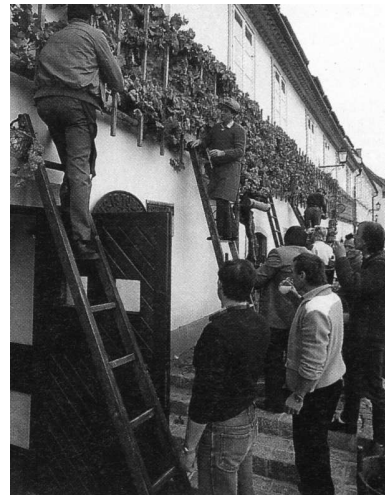
On Sunday, 3 July 2011, there will be an excursion to some of the most beautiful parts of Slovenia. The participation will be charged extra (about 70.-EUR per person). That will cover everything, the transportation, the (high-level) lunch (at lake Bled) and dinner (in Ljubljana) and the entrance fees (The Postojna Cave). For those participants who have already seen this tour alternative excursions will be organized.



Main square of Maribor, with plague sign. Mary's Column with the six statues was erected in 1743 by Jožef Štraub.



Lent, former Maribor landing on the banks of Drava



The oldest vine in the World

THE ORGANIZATION OF LIFE DURING THE SCHOOL/CONFERENCE

The School/Conference will be organized as follows:

Each working day Monday to Friday: lectures 9-10, 10-11; coffee/tea 11-11:30; lectures 11:30-12:30, 12:30-13:30; lunch 13:30-15:15; lectures 15:15-16:15; coffee/tea 16:15-16:45; lectures 16:45-17:45, 17:45-18:45; dinner 18:45-19:45; 19:45 - evening festival programme or other private programmes and activities. Exceptionally we will have a few evening lectures due to the extremely dense programme and high-quality offers by the invited lecturers. In the first week the schedule will be less dense than described here.

On Saturday morning, 2 July, there will be lectures and short reports followed by lunch as on working days. In the afternoon there will be a trip through the Maribor area as described above. On Saturday morning, 9 July, there will be lectures and short reports followed by lunch as on working days. In the afternoon there will be a social event or/and trip to celebrate the closure of the (successful) School/Conference, followed by the Last Dinner.

The Conference Place:

The lectures will take place in the Large Lecture Hall (**Velika dvorana**) in the Main University Building, on the ground floor (actually semi-basement), at Slomškov trg 15, just next to the Theatre (Slovensko Narodno Gledališče) and Opera. For the details of the location and more about the City of Maribor and its map please see our home page <http://www.camtp.uni-mb.si/chaos/2011/> and the links there. The capacity of the lecture hall is at least 160, and is air-conditioned. The Main University Building is a nicely renovated old 19th Century building, opened in September 2000, in excellent shape with excellent infrastructure. There will be extra internet points for your use during the Conference time, especially to check and to send your e-mails.

The University Library Building is located just behind the Main University Building, in the central and most beautiful square of the city, called Slomškov trg, with the Cathedral situated in central position, and surrounded by the historic buildings of the Theological Faculty, the University Building, the National Theatre and Opera, the central Post Office building. There is a small green park inside, surrounded by many nice coffee houses offering a variety of refreshments, suitable for private discussions in small groups. Also, the Main University Building is just at 8 minutes walking distance from the Hotel PIRAMIDA, at Heroja Šlandra 10, (which normally is the accommodation place for the invited lecturers and those participants wishing explicitly the accommodation there - the latter one at their own extra expenses), and also only at 8 minutes walking distance from the students residence in Dijaški dom DRAVA, at Smetanova ulica 67.

The Accommodation:

All invited lecturers and speakers will be accommodated in single rooms (unless requested otherwise) in **Hotel PIRAMIDA, Heroja Šlandra 10, SI-2000 Maribor, Telephone +(386) (2) 2344 400, Telefax +(386) (2) 2344 360**, where they can also register upon the arrival to get the Conference materials. Hotel PIRAMIDA is situated at a central quite convenient location in the City Center, not far from the famous and old Hotel OREL and the nearby baroque City Castle, in the pedestrian zone, and close to the very nice and old City Park. It is 5 minutes walking from Hotel OREL and 8 minutes walking to the Conference place in the Main University Building. It is a 4 star hotel, and it has all the features of best quality, especially the cuisine. In the city we have several superb swimming, sauna, fitness and health centers. One is FONTANA located at Koroška cesta 172, Telephone +(386) (2) 2344 100, which belongs to the same company like hotels Orel and Piramida, namely **Terme Maribor**. Therefore all hotel guests of Hotel PIRAMIDA can use the swimming, fitness and sauna center FONTANA every day free of charge. Just get a voucher at the reception of Hotel PIRAMIDA before going there.

There is a small bus (shuttle minibus) leaving for FONTANA every 30 minutes from Maistrov trg, just next to the City Castle. Hotel guests can also borrow a bicycle free of charge at the Hotel PIRAMIDA, others at the Tourist Information Center:

<http://www.maribor-slovenia-travel-guide.com/getting-around.html>.

As mentioned above, PIRAMIDA is just at the 8 minutes walking distance from the Conference place (the Main University Building). All those participants accommodated in Hotel PIRAMIDA will have all meals (breakfast, lunch and dinner) in the restaurants of the hotel. The participants ("students"), normally accommodated in the students residence, will also join us to have lunch and dinner in the restaurants of the hotel PIRAMIDA. This is included in their participation fee.

The participants (who are not invited lecturers), will be normally accommodated in single rooms (unless requested otherwise) in the student residence **Dijaški dom DRAVA, Smetanova ulica 67, SI-2000 Maribor, Telephone +(386) (2) 2348 150, 2348 154, Telefax +(386) (2) 2348 170**. The registration office there will be open 24 hours a day. The quality of accommodation meets the standards of a decent hotel. They will have their breakfast served in the restaurant of this residence establishment. For lunch and dinner, they will join the lecturers in the restaurants of the hotel PIRAMIDA, which is included in the participation fee. (Normally it is 1200.-EUR, payable in two payments, the advance payment for 600.-EUR which must be made by transfer in parallel with the submission of the Application form, and the rest for 600.-EUR payable at the registration in cash. The deadline is 20 May 2011. For late applications after 20 May 2011, and before 22 June 2011, the advance payment increases to 850.-EURO, whilst 600.-EURO is the rest to be paid upon arrival in Maribor.) This student residence is very nice, having extra facilities such as fitness rooms, music room with piano, the evening bar (coffee, drinks and refreshments) open until 10-11 pm. The distance from the residence establishment to the Conference place in the Main University Building is just about 8 minutes walking.

THE HOT LINE (TELEPHONE) 24 HOURS A DAY:**Please call:****+(386) (31) 307 360 (Prof. Marko Robnik) or****+(386) (41) 768 442 (Prof. Dean Korošak)**

If you have any problems (one week) before and during the School/Conference, or even after the School/Conference (one week), there will be open special **hot lines (telephone) +(386) (31) 307 360 (Prof. Marko Robnik) and +(386) (41) 768 442 (Prof. Dean Korošak)**, where you can get the requested information, advice and help at any time.

THE PARTICIPATION FEE, THE APPLICATION AND THE DEADLINES

The application for the participation is possible only electronically. All information is available on the conference home page:

<http://www.camtp.uni-mb.si/chaos/2011/>

There you will find the Application form as well as the Arrival form, both in plain ascii format. Please fill them in and send them by e-mail to the address chaos@uni-mb.si.

If there is any problem please contact us for help at the e-mail address:

chaos@uni-mb.si

THE PARTICIPATION IS LIMITED TO ABOUT 140 PERSONS, and is based on the application and invitation procedure. More or less this implies that the admission will be based on the principle "first come, first served", and so the interested persons are strongly advised to apply as soon as possible. When the maximum capacity of 140 accepted participants will be reached, the application procedure will be closed and no further admission will be possible. After receiving their application and the advance payment the candidates - applicants will be notified whether they are admitted - invited or not.

The participation fee normally is 1200.-EUR (before 20 May 2011), whilst for late applications (after 20 May and before 22 June 2011) it is 1,450.-EUR.

This participation fee covers the tuition fee and all local expenses, accommodation, all meals with drinks included, banquets, private concerts, Festival Lent entrance fees, the excursion through the City of Maribor, the wine tasting tour, unlimited tea and coffee and other soft drinks during the lecture breaks, except for the trips on Sunday, 3 July 2011.

The important **DEADLINES** are as follows:

Applications with Abstracts for communications (posters or short reports): 20 May 2011

(Send the advance payment for 600.-EUR and the copy of the bank transfer by fax to +(386) (2) 2355 360. Cheques are not accepted. The amount 600.-EUR must be paid in cash upon arrival at registration. Your filled Application form with C.V. and list of publications should be sent by e-mail to chaos@uni-mb.si, whilst two letters of recommendation should be sent directly to the same e-mail address chaos@uni-mb.si by the writers of recommendations)

Normal application _____: Friday 20 May 2011

(Send the advance payment for 600.-EUR and the copy of the bank transfer by fax to +(386) (2) 2355 360. Cheques are not accepted. The amount 600.-EUR must be paid in cash upon arrival at registration.)

Late application (after Friday 20 May 2011) _____: Wednesday 22 June 2011

(Send the advance payment for 850.-EUR and the copy of the bank transfer by fax to +(386) (2) 2355 360. Cheques are not accepted. The amount 600.-EUR must be paid in cash upon arrival at registration.)

Application for financial support for participants _____: Friday 22 April 2011

(Follow the normal application procedure including the advance payment and send your filled Application form with C.V. and list of publications to the e-mail address chaos@uni-mb.si, and two letters of recommendation should be sent directly to the e-mail address chaos@uni-mb.si by the writers of the recommendations.)

Arrival and Reservation Notice _____: Wednesday 22 June 2011

(This form is available in plain ascii format on the conference home page and should be filled in and sent as early as possible to the e-mail address chaos@uni-mb.si)

The advance payment (for normal application 600.-EUR before 20 May 2011, and 850.-EUR for late application after 20 May 2011 and before 22 June 2011) should be performed and the proof of it (faxed copy of the bank transfer) must be received within one week time after the electronic application by e-mail. The bank transfer should go to the account of the Summer School/Conference:

Beneficiary:

**Center za upor. mat. in teor. fiz. CAMTP
Krekova 2, SI-2000 Maribor, Slovenia**

Beneficiarie's Bank Institution:

**NOVA KREDITNA BANKA MARIBOR d.d.
Vita Kraigherja 4
SI-2000 Maribor, Slovenia
International Bank Account number (IBAN): SI56045150000891647
SWIFT code: KBMASI2X**

The proof of the payment - a copy of the bank transfer - should be sent obligatory to the fax +(386) (2) 2355 360. Please, on the bank transfer order form, clearly write your full name and surname, the address, the city and the country of your residence. This is required by the new Slovenian law to prevent the international illegal money laundry. If an institution is paying the advance payment for you, then please clearly write the name and the full address of the institution plus your name and surname.

VERY IMPORTANT: Please pay all bank transfer charges on your side, as otherwise the receiving bank imposes big charges like up to 50.-EUR per transaction.

The participants from Slovenia should pay the advance payment by a bank transfer to the account: (**TRR račun**):

Center za upor. mat. in teor. fiz.

TRR račun: 04515-0000891647

pripis: za Poletno Šolo

and otherwise follow the same procedure as advised above for foreign applicants.

All the applications must be done electronically-only by sending the Application form by e-mail to the address chaos@uni-mb.si. The Application form in plain ascii format, along with all other instructions, is available on our conference home page:

<http://www.camtp.uni-mb.si/chaos/2011/>

The Contact Address of the School/Conference:

CAMTP, Summer School

University of Maribor

Krekova 2, SI-2000 Maribor, Slovenia

Telefax +(386) (2) 2355 360

Telephone +(386) (2) 2355 350 and 2355 351

e-mail chaos@uni-mb.si

Applications without the advance payment will not be processed. Those participants who wish to pay the full participation fee 1200.-EUR for normal application and 1450.-EUR for the late application, already as advanced payment, in total, are welcome to do so. In cases of cancellation for any reason the applicants will be refunded the whole amount except for 200.-EUR cancellation fee. In cases of rejected application the full amount will be refunded.

All further information with the current updates is available on our home page address:

<http://www.camtp.uni-mb.si/chaos/2011/>

In case of a serious doubt you are welcome to contact the Director Professor Dr. Marko Robnik personally at **Robnik@uni-mb.si**.

THE APPLICATION PROCEDURE AND THE ARRIVAL AND RESERVATION FORM

Application is possible **only in the electronic form, by sending an e-mail with the filled Application form to the e-mail address chaos@uni-mb.si**. The Application form in plain ascii format can be found at our conference home page:

<http://www.camtp.uni-mb.si/chaos/2011/>

The proof of the advance payment - a copy to our fax - must be received at our address of CAMTP at latest one week after the electronic application (see above). Then, upon the receipt of the application and of the proof of the advance payment the candidates will be notified whether they are accepted or not, including their **communications**. When sending the payment please clearly indicate your name and the identity (the full address) beyond any doubt. When the maximum capacity of about 140 participants will be reached the School/Conference will be simply closed for all further applications (the status will be available on our conference home page). Thus the organizers strongly recommend to apply as early as possible.

The Arrival and reservation form (the form is available at our conference home page given above) should be submitted by e-mail at latest by 22 June 2011, possibly much earlier if you already know your arrival data.

All registered - admitted participants and interested persons registered on the e-mailing list will receive our regular circularies with the up-to-date information on the School/Conference.



University of Maribor, main building

A WORD ABOUT CAMTP

CAMTP - Center for Applied Mathematics and Theoretical Physics University of Maribor, Slovenia

The Center for Applied Mathematics and Theoretical Physics (**CAMTP**) was founded in June 1990 as a new research institute under the direction of Professor Dr. Marko Robnik and became an independent academic institution (member) of the University of Maribor in July 1991. The financial support is provided entirely by the Slovenian Research Agency, a department of Ministry of Higher Education, Science and Technology of the Republic of Slovenia. Its research activities and collaborations are strongly internationally oriented, and the institute now has already a number of external collaborators and research visitors from among the leading scientists in Slovenia and in foreign countries: Germany, Japan, USA, Austria, Italy, Greece, Spain, Belarus, Russia and China.

The theoretical research programme covers four dominant fields:

- (1) Nonlinear dynamics of classical and quantum nonintegrable and chaotic systems,
- (2) Mathematical and statistical physics and theory of dynamical systems.,
- (3) Computer algebra,
- (4) Theory of ordinary differential equations and dynamical systems

Some collaboration in the theoretical astrophysics is also involved in joint projects with the researchers of the University of Bonn. **CAMTP** collaborates also with the University of Ljubljana. The Center has bilateral agreements (Memorandum of understanding) with Waseda University, Tokyo, Munich University of Technology, Institute Rudjer Bošković, Zagreb, Osaka Prefecture University, several institutions in Minsk, Belarus, and in Moldova. The Center is one of the supporting and founding institutions of the international interdisciplinary journal *Nonlinear Phenomena in Complex Systems (NPCS)*, founded in 1998, which is published in Minsk, Belarus, whilst its online version is maintained at **CAMTP**.

The purpose of the Center is to carry out the theoretical research, to maintain the international academic relations and collaborations in these fields, and to educate young research students from Slovenia and abroad. **CAMTP** has excellent computer facilities. The Center is also the scientific organizer of the Summer Schools/Conferences "*Let's Face Chaos through Nonlinear Dynamics*" held in 1993 and in 1994 at the University of Ljubljana, and in 1996, 1999, 2002, 2005, 2008+ at the University of Maribor: The 8th one will be held on 26 June - 10 July 2011, according to the tradition now. Apart from that CAMTP organizes 4 other series of scientific meetings: Christmas Symposia of Physicists, Japan-Slovenia Seminars, European Advanced Studies Conferences and SOCRATES Workshops.

The address:

Center for Applied Mathematics and Theoretical Physics

Director: Professor Dr. Marko Robnik

University of Maribor

Krekova 2

SI-2000 Maribor

Slovenia

Telephone: + (386) (2) 2355 350 and 2355 351

Telefax: + (386) (2) 2355 360

e-mail: robnik@uni-mb.si, **www home page:** <http://www.camtp.uni-mb.si>

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The Production Team:

Text, LaTeX Typesetting and Editing:

Professor Dr. Marko Robnik

Director of the School/Conference

Director of CAMTP

Final Editing: Benjamin Batistić, CAMTP

Cover Design:

Marko Robnik in collaboration with DESIGNSTUDIO d.o.o., Maribor

Photographs:

Bogo Čerin, Maribor

Printed by:

DESIGNSTUDIO d.o.o., Maribor

Closing time: Friday 24 December 2010 03:00

