

Marine Systems Institute at TTU

The Marine Systems Institute was founded in June 2002 to continue hydrophysical marine research started in Tallinn Technical University already in 1960s. The institute focuses on the interdisciplinary fundamental and applied studies of physical, hydrodynamical and biogeochemical processes as well as their interactions in the Baltic Sea in the context of both natural and anthropogenic forcing factors.

The main areas of research are: the Baltic Sea water and matter exchange processes in changing climatic conditions, and dynamical and optical processes in the coastal sea areas. The applied studies cover a wide spectrum of topics, including hydrophysical monitoring of marine environment, hydrometeorological operational information systems, environmental impact assessments, measurement and modelling of currents, oil spill models, studies of harmful algae, analysis and forecast of ice properties and conditions, wind wave forecast, analysis of fast ferries' wake wash.

Centre for Nonlinear Studies - CENS

CENS was founded in 1998 as a virtual centre, which unites research groups in the Institute of Cybernetics at TTU, Marine Systems Institute at TTU, Centre of Biomedical Engineering of TTU, and Chair of Geometry of Tartu University.

The CENS research topics include: nonlinear waves including solitons, phase-transformation fronts and acoustodiagnosics, fractality and biophysics including cardiac mechanics, nonlinear integrated photoelasticity, waves in fluids, geometrical methods for nonlinear systems, nonlinear signal processing.

In 2002, CENS was recognised as an Estonian Centre of Excellence in Research.

Co-ordinators and contact

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Registration

For pre-registration to the school or for further information, please SEND AN E-MAIL with your personal data (full name, title, organisation or university, status, full postal address, e-mail address) to either of the co-ordinators BEFORE June 30, 2003.

Since the number of participants is limited, the acceptance will be based on the receiving order of applications. The notification of acceptance with the final programme and additional information will be sent to the applicants by August 31, 2003, at the latest. The participants applying for support will be informed about the decision of the Scientific Council by September 15, 2003.

Venue

Hageri (pop. about 400) is a small village of rich history today. The name apparently dates back to ancient times and has no explicit interpretation. The site was first mentioned in *Liber Censur Daniae* (1241/1243) as "Hakriz' or 'Haccriz'". From that time, the place has been permanently habited and frequently mentioned in different chronicles. It is a heart of one of the oldest Christian parishes in Estonia. The local school counts its history since 1698.



Marine Systems Institute
at Tallinn Technical University

Centre for Nonlinear Studies - CENS
Institute of Cybernetics
at Tallinn Technical University

Advanced Study School Nonlinear Processes in Marine Sciences

October 12-19, 2003
Hageri, Estonia



First announcement
and
Call for pre-registration

Objective and topics

The main objective of the school is to give a systematic survey on contemporary ideas and methods dealing with the most important nonlinear phenomena in marine sciences that will be presented by leading scientists in these fields. From a wide variety of issues of both theoretical and practical interest, the school concentrates on the wave mechanics and transport processes. An introduction to the state-of-the-art of geophysical turbulent boundary layers and Lagrangian transport in geophysical flows will be presented. The courses are mostly designed for PhD students. Also, well-prepared MSc students may participate. The school might be also of interest for young researchers and marine engineers who want to get an overview of several key nonlinear processes in marine sciences and/or are specialised in different areas of marine and environmental sciences including, yet not limited with meteorology, oceanography, geophysical hydrodynamics, ocean and coastal engineering, pollution control.

Scientific Committee:

Chairman: **Tarmo Soomere**
(Marine Systems Institute, CENS, Tallinn)

Co-Chairman: **Jüri Engelbrecht**
(Institute of Cybernetics, CENS, Tallinn)

Jüri Elken (Marine Systems Institute, Tallinn)

Roger Grimshaw (Loughborough University)

Heinz Günther (Institute for Coastal Research, GKSS Geesthacht)

Efim Pelinovsky (Institute of Applied Physics, Nizhny Novgorod)

Antonello Provenzale (ISAC-CNR, Turin and CIMA, University of Genoa)

Sergej Zilitinkevich (Uppsala University)

Lectures and presentations

Key lecture courses:

- ◆ Long surface waves with description of nonlinear theory, rogue waves in shallow & deep water and tsunamis (Efim Pelinovsky)
- ◆ Internal solitary waves in the coastal oceans (Roger Grimshaw),
- ◆ Contemporary wind wave modelling and measurement techniques (Heinz Günther)
- ◆ Lagrangian transport in geophysical flows (Antonello Provenzale)
- ◆ Geophysical turbulent boundary layers (Sergej Zilitinkevich)

Special lecture:

- ◆ Introduction to the metron theory (Klaus Hasselmann)

Supplementary lectures and presentations

- ◆ Soliton interactions and interaction solitons
- ◆ An introduction to stochastic diffusion
- ◆ Baltic marine environment and nonlinear processes
- ◆ Long-living patterns of KdV solitons
- ◆ Weakly nonlinear world and the kinetic theory
- ◆ Fast ferries: advantage or misfortune
- ◆ Operational oceanography
- ◆ Student's seminar

Each key lecture course consists generally of three full lectures, each 2*45 min. Several courses contain optionally practical lessons at the discretion of the key lecturers. Supplementary lectures and presentations are designed either as a half or a full lecture. The participants are encouraged to prepare short papers to be presented at the students seminar, with the direct comments from the key speakers.

Accommodation

The school will be held in a brand-new boarding house in the Hageri Village about 35 km from Tallinn. The lectures will start after lunch on October, 12 and will end in the late afternoon on October, 18. The students are expected to arrive on Saturday, October 11 and to depart on Sunday, October 19. A shuttle service will be organised from the Tallinn City Centre on the days of arrival and departure. Participation in single lecture courses is possible on special request.

Costs

The school is sponsored by the Centre of Excellence for Nonlinear Studies at the Institute of Cybernetics. There is no registration fee. The participants will obtain course materials prepared by lecturers. Participants are expected to cover their travel and accommodation costs.

The cost for accommodation at the school premises, full board and shuttle service from/to Tallinn are 260€ per person in double rooms. A few single and triple rooms are available at special prices.

Support grants

The school will have limited funds at its disposal to provide partial support to 4-5 participants from developing countries of Central and Eastern Europe who cannot raise adequate funds from their home countries. The support will cover only board and lodging. The prospective participants who need financial assistance should send an application to one of the Co-ordinators together with a short (max. 300 words) statement explaining how his/her professional work or studies will benefit from attending the school.

Certificate

The participants attending the full course will receive a certificate serving as a basis for the credit points of MSc and PhD levels.