PROGRAM
for
FOURTH INTERNATIONAL CONFERENCE
APPLICATION OF MATHEMATICS IN TECHNICAL AND NATURAL SCIENCES
St. St. CONSTANTINE AND HELENA
JUNE 11-16, 2012

SUNDAY, JUNE 10, 2012

17:00-19:00	REGISTRATION
	Grand Hotel Varna – second floor, in front of hall of Ruski

MONDAY, JUNE 11, 2012

07:30-08:30	REGISTRATION
	Grand Hotel Varna – second floor, in front of hall of Ruski
08:30-09:00	OPENING (Grand Hotel Varna Hall of Ruski)
09:00-10:00	Room A (Grand Hotel Varna Hall of Ruski)
	Chair: Michail Todorov
	PLENARY LECTURE: Raytcho Lazarov
	Title: *Numerical Simulation of Flows in Highly Heterogeneous Porous Media*

10:00-10:15	COFEE BREAK

10:15-12:15	Parallel Session STIENTIFIC COMPUTING
	Room A (Grand Hotel Varna Hall of Ruski)
	Chair: Raytcho Lazarov
10:15-10:45	Speaker: Shakir Zeynalov
	Title: *Position Sensitive Fission Detection for Prompt Fission Neutron*
10:45-11:15	Speaker: Bozhidar Stoyanov
	Title: *Chaotic Cryptographic Scheme and its Randomness*

	Evaluation
11:15-11:45	Speaker: Rajna Georgieva
	Title: *Global Sensitivity Analysis of Compact Models in Nanodevices*
11:45-12:15	Speaker: Ivan Hristov
	Title: *Numerical Study of Fluxon Lattices in Long Josephson Stacks*

10:15-12:15	Special Session HPC GRID APPLICATIONS IN COMPUTATIONAL PHYSICS AND COMPUTATIONAL CHEMISTRY Room B (Grand Hotel Varna Hall of Varna2) Chair: Todor Gurov
10:15-10:45	Speaker: Emanoul Atanassov
	Title: *Efficient Implementation of a Stochastic Electron Transport Simulation Algorithm Using GPGPU Computing*
10:45-11:15	Speaker: Nikolai Manev
	Title: *Twisted Edwards Curves Integer Factorization on GPU Cluster*
11:15-11:45	Speaker: Kiril Shterev
	Title: *Comparison of Some Approximation Schemes for Convective Terms for Solving Gas Flow past a Square in a Microchannel*
11:45-12:15	Speaker: Mariya Durchova
	Title: *Improved Algorithm for Modeling Inelastic Backscattering from Surfaces*
12:30-14:00	**LUNCH**

14:00-15:45	Parallel Session MATHEMATICAL PHYSICS AND SOLITONS Room A (Grand Hotel Varna Hall of Ruski) Chair: Vladimir Gerdjikov
14:00-14:45	KEYNOTE SPEAKER: Gaetano Vilasi
	Title: *On the Gravitational Interaction of Light*
14:45-15:15	Speaker: Nikolai Kutev
	Title: *Global Existence of the Solutions to Boussinesq*

	Paradigm Equation with Supercritical Initial Energy
15:15-15:45	Speaker: Georgi Grahovski
	Title: *On the Integrability of KdV Hierarchy with Generic Self-consistent Sources*

14:00-15:45	Special Session SCALABLE NUMERICAL SOLUTION METHODS FOR PDEs
	Room A (Grand Hotel Varna Hall of Varna)
	Chairs: Ivan Georgiev

14:00-14:45	KEYNOTE SPEAKER: Johannes Kraus
	Title: *Algebraic Multilevel Methods Based on Domain Decomposition*
14:45-15:15	Speaker: Maria Lymbery
	Title: *Balanced Semi-Coarsening AMLI Preconditioning of Higher Order Elliptic Problems*
15:15-15:45	Speaker: Konstantinos Liolios
	Title: *A Numerical Approach to the Non-convex Dynamic Problem of Pipeline-soil Interaction under Environmental Effects*

15:45-16:00	COFEE BREAK

16:00-17:30	Parallel Session MATHEMATICAL PHYSICS AND SOLITONS
	Room A (Grand Hotel Varna Hall of Ruski)
	Chairs: L. Kovachev

16:00-16:30	Speaker: Daniela Georgieva
	Title: *A Class of Localized Solutions of the Linear and Nonlinear Wave Equations*
16:30-17:00	Speaker: Vladimir Gerdjikov
	Title: *On the N-wave Equations and Soliton Interactions in Two and Three Dimensions*
17:00-17:30	Speaker: Ivan Koprinkov
	Title: *Propagation Behavior of Ultrashort Light Pulses*

16:00-17:30	Special Session SCALABLE NUMERICAL SOLUTION METHODS FOR PDEs Room A (Grand Hotel Varna Hall of Varna) Chairs: J. Kraus
16:00-16:30	KEYNOTE SPEAKER: Stefan Radev Title: *Sinuous Instability of a Viscous Capillary Jet*
16:30-17:00	Speaker: Irina Georgieva Title: *Tomographic Reconstruction of Harmonic Functions*
17:00-17:30	Speaker: Clemens Hofreither Title: *FETI Solvers for a Non-standard Finite Element Method Based on Boundary Integral Operators*
19:30	WELCOME PARTY, G-BAR, GRAND HOTEL VARNA, SECOND FLOOR

TUESDAY, JUNE 12, 2012

08:30-09:30   Room A (Grand Hotel Varna Hall of Ruski)
                     Chair: Michail Todorov

                     PLENARY LECTURE: Vladimir Shaydurov
                     Title: *Four-stage Computational Technology with Adaptive*
                            Numerical Methods for Computational Aerodynamics

09:30-09:45   COFEE BREAK

09:45-11:45   Parallel Session NUMERICAL METHODS,
                     Room A (Grand Hotel Varna Hall of Ruski)
                     Chair: V. Shaydurov

09:45-10:15   Speaker: Krasimira Vlachkova
                     Title: *Comparison of Surface Subdivision Algorithms for*
                            Polyhedral Meshes
10:15-10:45   Speaker: Gergana Bencheva
                     Title: *On the Choice of Limiters in a Numerical Approximation*
                            of a Chemotaxis System with Non-homogeneous
                            Boundary Conditions
10:45-11:15   Speaker: Ivan Lirkov
                     Title: *Improving the Efficiency of Parallel Alternating*
                            Directions Algorithm for Time Dependent Problems
11:15-11:45   Speaker: Alexandre Fedoseyev
                     Title: *Parallelization of the Preconditioned IDR Solver for*
                            Modern Multicore Computer Systems

11:45-12:15   Poster Session, Room A
                     (Grand Hotel Varna Hall of Ruski)
                     Chair: V. Shaydurov

11:45-12:15   Speaker: Dobri Dankov
                     Title: *Viscous Drag in Steady State Gas Flow between Rotating*
                            Cylinders

09:45-12:15	Parallel Session CONTINUUM MECHANICS Room B (Grand Hotel Varna Hall of Varna) Chair: P. Minev
09:45-10:30	KEYNOTE SPEAKER: Merab Svanadze Title: *Mathematical Problems in the Full Coupled Theory of Poroelasticit*
10:30-11:00	Speaker: Nikolai Magnitskii Title: *Traveling Waves, Impulses and Diffusion Chaos in Excitable Media*
11:00-11:30	Speaker: Yonko Stoinov Title: *Influence of Different Boundary Conditions on the Dynamic Behavior of Cracked Magnetoelectroelastic Materials*
11:30-12:00	Parallel Session BIOMATHEMATICS, Room B (Grand Hotel Varna Hall of Varna) Chair: P. Minev
12:00-12:30	Speaker: Milen Borisov Title: *BifTools: Maple Package for Bifurcation Analysis of Dynamical Systems*
12:30-14:00	**LUNCH**
14:00-15:00	Room A (Grand Hotel Varna Hall of Ruski) Chair: Michail Todorov PLENARY LECTURE: Peter Minev Title: *A Direction Splitting Algorithm for Flow Problems in Complex/Moving Geometries*
15:00-15:45	Parallel Session BIOMATHEMATICS Room B (Grand Hotel Varna Hall of Ruski) Chair: R. Anguelov
15:00-15:45	KEYNOTE LECTURE: Jean Lubuma Title: *On Nonstandard Finite Difference Schemes in Biosciences*

15:00-15:45	Special Session HPC GRID APPLICATIONS IN COMPUTATIONAL PHYSICS AND COMPUTATIONAL CHEMISTRY, Room B (Grand Hotel Varna Hall of Varna) Chair: T. Gurov
15:00-15:45	Speakers: Marcin Paprzycki and Maria Ganzha Title: *AiG - Agent-based Resource Management System for the Grid*
15:45-16:00	COFEE BREAK
16:00-17:30	Parallel Session BIOMATHEMATICS Room A (Grand Hotel Varna Hall of Ruski) Chair: J. Lubuma
16:00-16:30	Speaker: Karyn Sutton Title: *Parameter Estimation in Dynamical Systems with Delays*
16:30-17:00	Speaker: Ako Sauga Title: *Resonant Behavior of a Fractional Oscillator with Fluctuating Mass*
17:00-17:30	Speaker: Erkki Soika Title: *Parametric Resonance of a Harmonic Oscillator with Fluctuating Mass*
16:00-17:30	Parallel Session SCIENTIFIC COMPUTING - cancelled, Room B (Grand Hotel Varna Hall of Varna) Chair:
16:00-16:30	Speaker: Andreas Savva - cancelled Title: *Patch-fitting on Surface Holes*
16:30-17:00	Speaker: Ali Sabbagh - cancelled Title: *Spatiotemporal Chaos due to Spiral Waves Core Expansion and Its Elimination in Excitable Media*
17:00-17:30	Speaker: Jordan Genoff - cancelled Title: *High Fidelity Finite Length Markov Chain Walks*

16:00-16:45   Speaker: Alexandre Fedoseyev – extraordinary very
               interesting talk about the Boltzmann equation

WEDNESDAY, JUNE 13, 2012

08:30-09:30	Room A (Grand Hotel Varna Hall of Ruski) Chairs: Nikolai Kutev and Nectarios Papanicolaou PLENARY LECTURE: Valentin Gushchin Title: *Mathematical Modeling of the 3D Separated Viscous Fluid Flows*

09:30-09:45	COFEE BREAK

09:45-11:45	Parallel Session SCIENTIFIC COMPUTING, Room A (Grand Hotel Hall of Ruski) Chair: N. Papanicolaou
09:45-10:15	Speaker: Atanas Ivanov Title: *Parametric Time Series Analysis of Daily Air Pollutants of City of Shumen, Bulgaria*
10:15-10:45	Speaker: Shakir Zeynalov Title: *Position Sensitive Fission Detection for Prompt Fission Neutron*
10:45-11:15	Speaker: Ivan Bazhlekov Title: *Numerical Simulation of Drop Coalescence in the Presence of Film Soluble Surfactant*
11:15-11:45	Speaker: Georgi Georgiev Title: *Short Spirals on the Shape Sphere*

09:45-11:45	Special Session HPC GRID APPLICATIONS IN COMPUTATIONAL PHYSICS AND COMPUTATIONAL CHEMISTRY**,** Room B (Grand Hotel Varna Hall of Varna) Chair: Emanouil Atanassov
09:45-10:15	Speaker: Dimiter Syrakov Title: *Operational Pollution Forecast for the Region of Bulgaria*
10:15-10:45	Speaker: Kostadin Ganev Title: *Numerical Study of the Wind Energy Potential in*

	Bulgaria – Some Preliminary Results
10:45-11:15	Speaker: Sofiya Ivanovska
	Title: *Semi-coarsening Multilevel Preconditioning of Bilinear Nonconforming FEM Systems*
11:15-11:45	Speaker: Radoslava Goranova
	Title: *Web Service Module for Access to g-Lite*

12:00-14:00	**LUNCH**

14:00-18:00	**EXCURSION AND SOCIAL ACTIVITIES**
	(The rock monastery of Aladja and the river of Kamchiya)

THURSDAY, JUNE 14, 2012

08:30-09:30	Room A (Grand Hotel Varna Hall of Ruski) Chair: Michail Todorov

PLENARY LECTURE: Svetozar Margenov
Title: *On Semi-coarsening Multilevel Preconditioning of*
Higher Order FEM Systems

09:30-09:45	COFEE BREAK

09:45-12:15	Parallel Session APPLIED ANALYSIS Room A (Grand Hotel Varna Hall of Ruski) Chair: S. Margenov

09:45-10:15	Speaker: Emiliya Bazhlekova Title: *Computational Approach to Thornley's Problem by* *Bivariate Operational Calculus*
10:15-10:45	Speaker: Inger Fabris-Rotelli Title: *On the Axiomatization of the Scale-space Theory*
10:45-11:15	Speaker: Anna Antonova Title: *Dimensionless Goodwin's Equation of Business Cycle*
11:15-11:45	Speaker: Wojchiech Kempa Title: *Transient Analysis of the Output Process in the GI/M/1-* *type Queue with Finite Buffer*
11:45-12:15	Speaker: Snezhana Gocheva-Ilieva Title: *Numerical Study of Gas Temperature Distribution in a* *Copper Bromide Laser Active Medium*

09:45-10:45	Parallel Session MATHEMATICAL PHYSICS AND SOLITONS Room B (Grand Hotel Varna Hall of Varna) Chair: N. Kutev

09:45-10:15	Speaker: Juan Olives Title: *Surface Equations and Singularity at a Triple Contact* *Line for a Deformable Body*

10:15-10:45	Speaker: Nectarios Papanicolaou
	Title: *Numerical Simulation of Nonlinear Electromagnetic Wave Propagation in Nematic Liquid Crystal Cells*

12:15-14:00	**LUNCH**

14:00-15:45	Special Session SCALABLE NUMERICAL SOLUTION METHODS FOR PDEs, Room A (Grand Hotel Varna Hall of Ruski)
	Chair: S. Margenov

14:00-14:45	KEYNOTE SPEAKER: Radim Blaheta
	Title: *Block Preconditioners for Mixed and Multiphysics Problems*

14:45-15:15	Speaker: Ivan Georgiev
	Title: *Semi-coarsening Multilevel Preconditioning of Bilinear Nonconforming FEM Systems*
15:15-15:45	Speaker: Krasimir Georgiev
	Title: *Some Notes on Applying Approximate LU-factorizations as Preconditioners in Eight Iterative Methods for Solving Systems of Linear Algebraic Equations*

14:00-15:00	Parallel Session APPLIED ANALYSIS
	Room B (Grand Hotel Varna Hall of Varna)
	Chair: A. Antonova

14:00-14:30	Speaker: Roumen Anguelov
	Title: *Hausdorff Continuous Solutions of Conservation Laws*
14:30-15:00	Speaker: Ivan Raykov
	Title: *Applications of Fitzpatrick Functions for Solving Optimization Problems*

15:45-16:00	COFEE BREAK

16:00-17:00	Special Session SCALABLE NUMERICAL SOLUTION

METHODS FOR PDEs, Room A (Grand Hotel Varna Hall of Ruski)
Chair: K. Georgiev

16:00-16:30   Speaker: Tzvetan Ostromsky
Title: *An Efficient Highly Parallel Implementation of a Large Air Pollution Model on an IBM Blue Gene Supercomputer*
16:30-17:00   Speaker: Yavor Vutov
Title: *Computer Simulation of RF Liver Ablation on an MRI Scan Data*

20:00-24:00   **BANQUET, restaurant of Kopitoto**

FRIDAY, JUNE 15, 2012

08:30-09:30	PLENARY LECTURE: Leonid Turchak *Modeling of Wake Vortex Safety in Aviation* Room A (Grand Hotel Varna Hall 1) Chair: Michail Todorov

09:30-09:45	COFEE BREAK

09:45-11:15	Session NUMERICAL METHODS Room A (Grand Hotel Varna Hall of Ruski) Chairs:

09:45-10:15	Speaker: Anastasis Polycarpou Title: *Numerical Modeling of Wave Propagation in Liquid Crystals using a Mode-matching Approach*
10:15-10:45	Speaker: Karsukiro Sakai/Daishi Watabe (telebridge) Title: *SA Third-order Computational Method for Numerical Fluxes to Guarantee Nonnegative Difference Coefficients for Advection-diffusion Equations in a Semi-conservative Form*

10:45-11:15	Special Session APPLIED ANALYSIS Room A (Grand Hotel Varna Hall of Ruski) Chairs:

10:45-11:15	Speaker: Boris Ananiev Title: *State Estimation for Linear Stochastic Differential Equations with Uncertain Disturbances via BSDE Approach*
11:15-11:45	Speaker: Olga Zeynalova Title: *Prompt Fission Neutron TOF Data Analysis*
11:45-12:15	Speaker: Gaik Ambartsoumian Title: *Injectivity and Exact Inversion of Ultrasound Operators in the Spherical Geometry*

12:30-14:00	**LUNCH**

14:00	**CLOSING THE CONFERENCE –** Grand Hotel Varna Hall of Ruski

POSTER PRESENTATION

Dobri Dankov
Title*: Viscous Drag in Steady State Gas Flow between Rotating Cylinders*