

**PROGRAM**  
**for**  
**The IMACS WORLD CONGRESS on**  
**Computational and Applied Mathematics & Applications in Science and**  
**Engineering.**

**ATHENS, GA**  
**August 03-05, 2009**

---

**SUNDAY, August 02, 2009**

06:00 – 07:00 REGISTRATION  
05:00 – 07:00 RECEPTION

---

**MONDAY, AUGUST 03, 2009**

07:00 – 09:00 REGISTRATION  
08:00 – 08:30 WELCOME, Masters Hall  
Thiab R. Taha/Program Chair and Conference Coordinator  
Robert Beauwens / IMACS President  
Event Manager/Georgia Center

---

8:30 - 9:30 KEYNOTE LECTURE: Zdzislaw Jackiewicz, Masters Hall  
Title: General Linear Methods for Ordinary Differential Equations  
Chair: Robert Beauwens

---

09:30 – 10:00 **COFFEE BREAK**

---

10:00 - 12:00 SESSION 1, Masters Hall  
Chair: Robert Beauwens  
Title: Iterative methods in scientific computations

10:00 – 10:20 Speaker: Lydia Novozhilova, Sergei Urazhdin, John Lee  
Title: Simulation and qualitative study of a coupled Landau-Lifshitz-Gilbert system  
with spin-transfer torque

10:20 – 10:40 Speaker: Mardochée Magolu monga Made  
Title: On some strategies for improving parallel preconditionings

10:40 – 11:00 Speaker: Christina Christara and Jingrui Zhang  
Title: A high performance method for the biharmonic Dirichlet problem on  
rectangles

11:00 – 11:20 Speaker: Mahmud A. Mehemed Abughalia  
Title: New Techniqueto Slove Nonlinear Problems

11:20 – 11:40 Speaker: Robert Beauwens  
Title: On the parallelization of approximate factorization preconditioners

11:40 – 12:00 Speaker: Enguo Gu  
Title: Analysis on dynamical model in multi-agent fishery with partial agent  
cooperation

---

10:00 - 12:00    **SESSION 2, Room Q**  
 Chair: Basem Attili  
 Title: Numerical methods for Differential and Differential Algebraic Systems

10:00 – 10:20    **Speaker: Basem Attili**  
 Title: Numerical Treatment of Differential Algebraic Systems of Index 2 Using the Hilber-Hughes-Taylor- (HHT-) Method

10:20 – 10:40    **Speaker: Andriy Pototsky and Natalia Janson**  
 Title: Synchronization of a large number of continuous one-dimensional stochastic elements with time delayed mean field coupling

10:40 – 11:00    **Speaker: Luca Gerardo-Giorda**  
 Title: Optimized Schwarz Methods for Maxwell's System

11:00 – 11:20    **Speaker: Dan Rusu**  
 Title: Pattern Formation in Two-Dimensional Electrohydrodynamics

11:20 – 11:40    **Speaker: Mohamed Gaith, Imad Al Hayek**  
 Title: Correlation Between Overall Elastic Stiffness, Bulk Modulus and Interatomic Distance in Anisotropic Materials: Semiconductors

11:40 – 12:00    **Speaker: Mukesh Kumar**  
 Title: Parameter-Uniform Numerical Methods for Time Dependent Singularly Perturbed Reaction-Diffusion System

---

10:00 - 12:00    **SESSION 5, Room R**  
 Chair: C. Kazanci, A. Sornborger and M. Adams.  
 Title: Mathematical and Computational Biology

10:00 – 10:20    **Speaker: Vassily Lyubetsky, Elena Zhizhina, Lev Rubanov**  
 Title: Gibbs Field Approach for Evolutionary Analysis of Regulatory Signal of Gene Expression under Constraints on Secondary Structure

10:20 – 10:40    **Speaker: Enrique Arribas, Ramon Varon, Francisco Garcia-Sevilla**  
 Title: wREFERASS: Rate Equations for Enzyme Reactions at Steady State under MS-Windows

10:40 – 11:00    **Speaker: Andrew Sornborger, Louis Tao**  
 Title: Dimensional reduction of a visual cortical network model

11:00 – 11:20    **Speaker: Hassan Fathallah-Shaykh, Jerry Bona**  
 Title: Mathematical Model of the Drosophila Circadian Clock: Loop Regulation and Transcriptional Integration

11:20 – 11:40    **Speaker: David Luper, John Schramski, Caner Kazanci, Hamid Arabnia**  
 Title: Repetition and Homogeneity Buried in Complex Ecosystems: Using Pattern Recognition in Ecological Network Analysis

---

**12:20 - 1:20    LUNCH**

---

---

1:30 – 2:30	<p><b>KEYNOTE LECTURE:</b> Jack Dongarra, Masters Hall  Title: An Overview of High Performance Computing and Challenges for the future"  Chair: Thiab Taha</p>
<hr/>	
2:40 - 3:20	<p><b>CONTRIBUTED PAPERS,</b> Masters Hall  Chair: Andy Nonaka</p>
2:40 – 3:00	<p>Speaker: George Shu Heng Pau, Andy Nonaka  Title: Reduced Basis Method for Nanodevices Simulation</p>
3:00 – 3:20	<p>Speaker: Abdallah Badr  Title: Numerical solution of linear differential equations with fractional order</p>
<hr/>	
2:40 - 3:20	<p><b>CONTRIBUTED PAPERS,</b> Room Q  Chair: S.M. Lee</p>
2:40 – 3:00	<p>Speaker: S.M. Lee, J.H. Park, H.Y. Jung  Title: An improved robust stability criterion for uncertain cellular neural networks with time-varying delay</p>
3:00 – 3:20	<p>Speaker: Murat Adivar  Title: Function Bounds for Solutions of Volterra Integro Dynamic Equations on Time Scales</p>
<hr/>	
2:40 - 3:20	<p><b>CONTRIBUTED PAPERS,</b> Room R  Chair: Gennady Sintotskiy</p>
2:40 – 3:00	<p>Speaker: Roland Kasper and Gennady Sintotskiy  Title: Component-oriented simulation of electrical circuits in the field of mechatronic systems</p>
3:00 – 3:20	<p>Speaker: Xiaoping Lu and Peter Rhodes  Title: A Semi-analytic Solution of American Style Down-and-Out Call Options</p>
<hr/>	
<b>3:30 – 4:00</b>	<b>COFFEE BREAK</b>
<hr/>	
4:00 – 5:20	<p><b>CONTRIBUTED PAPERS,</b> Masters Hall  Chairs: Radu Cascaval</p>
4:00 – 4:20	<p>Speaker: Paul Christodolides and Frederic Dias  Title: Rising Streams Hitting a Horizontal Plate</p>
4:20 – 4:40	<p>Speaker: Ankit Jain, Wei Yu, Harini Medikonduru, Ryan Foster, Thiab Taha  Title: Web Based Interface for Numerical Simulations of Nonlinear Evolution Equations</p>
4:40 – 5:00	<p>Speaker: Travis Hunter and Radu Cascaval  Title: Numerical Studies of Interface Problems on Networks</p>
5:00 – 5:20	<p>Speaker: Xiaolin Li, Wurigen Bo, James Glimm, Yanhong Zhao, Fan Zhang  Title: Front tracking and application in computation of fluid instabilities, phase transition and financial derivative</p>

---

- 
- 4:00 – 5:20      **SESSION 5, Room Q**  
 Chairs: C. Kazanci, A. Sornborger and M. Adams.  
 Title: Mathematical and Computational Biology
- 4:00 – 4:20      Speaker: Anna Zagrebneva, Yuri Tyutyunov, Vasiliy Govorukhin  
 Title: Complex dynamics in predator-prey trophotaxis model
- 4:20 – 4:40      Speaker: Caner Kazanci , Julia Reese, Linda Mummy  
 Title: Quantifying indirect interactions in ecosystems
- 4:40 – 5:00      Speaker: Claudio Tebaldi  
 Title: Synchronization in Logistic Networks with Adaptive Competition

=====

---

**5:30 – 6:30      IMACS Board Meeting, Room Q**

---

- 4:00 – 5:20      **SESSION 3, Room R**  
 Chairs: Sang-Bae Kim  
 Title: Iterative Methods for sparse linear systems
- 4:00 – 4:20      Speaker: Yin Wang and Jun Zhang  
 Title: Solving 3D Convection Diffusion Equation using Sixth Order Compact  
 Difference Scheme and Multiscale Multigrid Method
- 4:20 – 4:40      Speaker: Jeonghwa Lee, Yin Wang, Cai-Cheng Lu, Jun Zhang  
 Title: Two-Step Preconditioning Techniques for Electromagnetic Wave Scattering  
 Problems
- 4:40 – 5:00      Speaker: Shuting Xu, Sang-Bae Kim, Jun Zhang  
 Title: Predicting the Solvability Space of the Preconditioned Krylov Subspace  
 Methods
- 5:00 – 5:20      Speaker: Sang-Bae Kim, Shuting Xu, Jun Zhang  
 Title: Data mining and prediction of SAI type matrix preconditioner

---

---

## TUESDAY, AUGUST 04, 2009

- 8:00 - 9:00 KEYNOTE LECTURE: Martin Berzins, Masters Hall  
Title: Multiscale Adaptive Simulations of Fires and Explosions using the Uintah Fluid-Structure Interaction Solver  
Chair: Tony Jakeman
- 
- 9:20 – 10:00 CONTRIBUTED PAPERS, Masters Hall  
Chairs: Ernest Tollner
- 9:20 – 9:40 Speaker: Ernest Tollner, John Schramski, Caner Kazanci, Bernie Patten  
Title: Control System Approaches to Ecological Systems Analysis
- 9:40 – 10:00 Speaker: Amir El-Haffaf  
Title: Existence theorem for a fourth order boundary value problem
- 
- 9:20 – 10:00 CONTRIBUTED PAPERS, Room Q  
Chairs: David Prager
- 9:20 – 9:40 Speaker: John Jakeman  
Title: Investigating the performance of high-order stochastic collocation methods
- 9:40 – 10:00 Speaker: David Prager  
Title: Stock Loan Valuation under a Regime-Switching Model with Mean Reverting States and Finite Maturity
- 
- 9:20 – 10:00 CONTRIBUTED PAPERS, Room R  
Chairs: Jennifer Erway
- 9:20 – 9:40 Speaker: Rao Li  
Title: The Spectral Moments and Energy of Graphs
- 9:40 – 10:00 Speaker: Jennifer Erway and Roummel Marcia  
Title: Backward stable diagonal pivoting methods without interchanges for solving unsymmetric tridiagonal systems
- 
- 10:00 – 10:30 COFFEE BREAK**
- 
- 10:40 – 11:40 SESSION 4, Masters Hall  
Chair: Andy Nonaka, Ann Almgren, and John Bell,  
Mike Zingale and Chris Malone  
Title: Adaptive mesh refinement strategies for simulating large multiphysics multiscale problems
- 10:40 – 11:00 Speaker: Andy Nonaka and George Shu Heng Pau  
Title: MAESTRO: An Adaptive Low Mach Number Hydrodynamics Algorithm for Astrophysical Flows
- 11:00 – 11:20 Speaker: James Lambers and Margot Gerritsen  
Title: Multi-Phase Flow Simulation with Integrated Upscaling, MPFA Discretization, and Adaptivity
- 11:20 – 11:40 Speaker: Jeffrey Banks and J. A. F. Hittinger  
Title: Adaptive and High-Order Methods for Laser-Plasma Interaction Problems

---

10:40 – 11:40	CONTRIBUTED PAPERS, Room Q Chair: Muhammad Asif Gondal
10:40 – 11:00	Speaker: Koffi B. Fadimba Title: On Uniqueness for Immiscible Two-Phase Flow through Porous Media
11:00 – 11:20	Speaker: Muhammad Asif Gondal and Alexander Ostermann Title: Exponential Runge--Kutta methods for option pricing
11:20 – 11:40	Speaker: <b>Valery Cherepennikov and Elena Talimonchuk</b> Cancel Title: <b>Polynomial quasisolutions of some linear functional difference equations</b>

---

10:40 – 11:40	SESSION 7, Room R Chair: Luca Gerardo-Giorda and Alessandro Veneziani Title: Numerical Methods in Cardiovascular Problems
10:40 – 11:00	Speaker: Giovanna Guidoboni, Suncica Canic, Roland Glowinski, Nicola Cavallini, Annalisa Quaini Title: Mathematical and Computational Modeling of blood flow: arteries, valves and transport
11:00 – 11:20	Speaker: Elio Agostoni, Mauro Perego, Sandro Salsa, Alessandro Veneziani Title: Modeling Focal Cerebral Ischemia: Microcirculation, Tissue Metabolism and Ion Diffusion
11:20 – 11:40	Speaker: Minisini Sara, Luca Formaggia, Paolo Zunino Title: Modelling Controlled Drug Release from Polymeric Matrices into the Arterial Wall with Application to Drug Eluting Stent

---

<b>11:50 – 1:00</b>	<b>LUNCH</b>
---------------------	--------------

---

1:00 – 3:00	CONTRIBUTED PAPERS, Masters Hall Chair: Mohmmad Ismail
1:00 – 1:20	Speaker: Yair Zarmi Title: Dynamical systems that are approximated by solitons - A new approach to soliton interactions
1:20 – 1:40	Speaker: Scott David Kelly and Parthesh Pujari Title: Energetics and Motion Planning for a Free Deformable Hydrofoil in an Ideal Fluid with Localized Discrete Vortex Shedding
1: 40 – 2:00	Speaker: Mohmmad Ismail Title: A New Linearly Implicit Scheme for the Coupled Nonlinear Schrödinger Equation
2:00 – 2:20	Speaker: Rolf Ryham Title: Global Existence and Long Term Behavior for Dissipative Systems in Electro-Hydrodynamics
2:20 – 2:40	Speaker: Khosrow Maleknejad and Saeed Sohrabi Title: An Approxiamtion Method for Solution of Nonlinear Volterra-Fredholm Integral Equations
2:40 – 3:00	Speaker: <b>Petre Birtea and Dan Comanescu (Cancelled)</b> Title: <b>Dissipatipn in Hamilton-Poisson systems</b>

---

1:00 – 3:00	SESSION 8, Room Q Chair: Ming Jun Lai Title: Mathematical Methods for Image Analysis
1:00 – 1:20	Speaker: Weihong Guo and Feng Huang Title: An Unsupervised Adaptive Non-local Means Filter to Remove Inhomogeneous Noise and Artifact
1:20 – 1:40	Speaker: Sung Ha Kang Title: Colorization via variational models and vector-valued RKHS function extension
1:40 – 2:00	Speaker: Ming-Jun Lai and Jingyue Wang Title: The convergence of a central difference discrete ROF model for image denoising
2:00 – 2:20	Speaker: Yang Wang and Hao-Min Zhou Title: Multiscale Total Variation Algorithms and Cross Channel Denoising for Color Images
2:20 – 2:40	Speaker: Weihong Guo and Wotao Yin Title: Bredge: Enhanced Compressive Imaging using Edge Detection

---

1:00 – 3:00	SESSION 7, Room R Chair: Luca Gerardo-Giorda and Alessandro Veneziani Title: Numerical Methods in Cardiovascular Problems
1:00 – 1:20	Speaker: Marina Piccinelli, Alessandro Veneziani, Luca Antiga Title: Influence of internal carotid artery geometry on aneurysms location and orientation
1:20 – 1:40	Speaker: Tiziano Passerini, Alessandro Veneziani Title: A geometrical multiscale model of cerebral circulation
1:40 – 2:00	Speaker: Lucia Mirabella, Marina Piccinelli, Tiziano Passerini, Eldad Haber, Alessandro Veneziani Title: Image-based tissue structural dynamics estimation in cardiovascular problems
2:00 – 2:20	Speaker: Radu Cascaval Title: Nonlinear Dispersive Effects and Dynamic Changes in the Human Cardiovascular System

---

<b>3:00 – 3:30</b>	<b>COFFEE BREAK</b>
--------------------	---------------------

---

3:30 – 4:50	SESSION 4, Master Hall Chair: Andy Nonaka, George Pau Title: Adaptive mesh refinement strategies for simulating large multiphysics multiscale problems
3:30 – 3:50	Speaker: Ralf Deiterding Title: A level-set-based adaptive mesh refinement method for fully coupled shock-driven fluid-structure interaction simulation

- 3:50 – 4:10 Speaker: Sachin Jain, Panagiotis Tsiotras, Hao-Min Zhou  
Title: Adaptive Multi-resolution Mesh Refinements for Evolution PDE's and Its Applications
- 4:10 – 4:30 Speaker: Robert Crockett, Phillip Colella, and Daniel Graves  
Title: Towards an adaptive, embedded boundary method for conjugate heat transfer in complex geometries
- 4:30 – 4:50 Speaker: Amik St-Cyr, Duane Rosenberg  
Title: A two level preconditioning strategy for adaptive SEM-based magnetohydrodynamics
- 

- 3:30 – 4:50 SESSION 6, Room Q  
Chairs: Tianming Liu  
Title: Computational and Numerical Methods in Imaging
- 3:30 – 3:50 Speaker: Ying Guo  
Title: Independent Component Analysis of Multi-subject Functional Magnetic Resonance Imaging Data
- 3:50 – 4:10 Speaker: Qun Zhao, Jason Langley, and Sunbok Lee  
Title: Computational Analysis of Phase Gradient Mapping in MRI
- 4:10 – 4:30 Speaker: Andrew Sornborger, Louis Tao, James Lauderdale  
Title: Imaging seizures at the brain-scale in larval zebrafish
- 4:30 – 4:50 Speaker: Ying Zhu  
Title: An integrated graphical environment to study adaptive behavior
- 

**5:30 – 6:30 IMACS General Assembly Meeting, Room Q**

---

- 3:30 – 4:50 SESSION 9, Room R  
Chairs: Khaled. Rasheed  
Title: Evolutionary Computation
- 3:30 – 3:50 Speaker: Liang Wang and Don Potter  
Title: SIB Code Search Based On Temporal Difference Learning
- 3:50 – 4:10 Speaker: Ananta Palani, W. D. Potter  
Title: Hypercube Snake-in-the-Box Exploration Using Level Representation
- 4:10 – 4:30 Speaker: Sal LaMarca  
Title: GAMSA: Genetic Algorithm for Multiple Stem Alignment
- 4:30 – 4:50 Speaker: Diptee Mehta and Khaled. Rasheed  
Title: Genetic-Algorithm-Based feature Selection for Biomaterial Modeling
- 

**7:00 – 9:00 BANQUET**

---

---

---

**WEDNESDAY, AUGUST 05, 2009**

---

---

- 8:00 – 10:00    **SESSION 6, Room Q**  
Chairs: Tianming Liu  
Title: Computational and Numerical Methods in Imaging
- 08:00 – 08:20    Speaker: Nicole Lazar  
Title: Creating and Comparing Group Maps from fMRI Data
- 08:20 – 08:40    Speaker: Nathan Yanasak, Chris Wright, Jerry Allison  
Title: On the Benefits of Non-Uniform Gradient Prescription in DTI
- 08:40 – 09:00    Speaker: Suchi Bhandarkar  
Title: Computational Methods in Virtual Reconstructive Craniofacial Surgery
- 09:00 – 09:20    Speaker: Oskar Skrinjar  
Title: Cardiac Motion Recovery from Magnetic Resonance Images
- 09:20 – 09:40    Speaker: Roummel Marcia, Zachary Harmany, Rebecca Willett  
Title: Sparse Poisson Intensity Reconstruction Algorithms

- 
- 08:00 – 10:00    **CONTRIBUTED PAPERS, Room R**  
Chairs: Faiz Ahmad and Vladimir Kazakov
- 08:00 – 08:20    Speaker: Vladimir Kazakov, Ruben Hernandezv  
Title: Applications of no Markovian Process Kinetic Equation for New Statistical  
Anaylsis Problems
- 08:20 – 08:40    Speaker: Faiz Ahmad and Muneer Rashid  
Title: Counting Invariants of a Tensor
- 08:40 – 09:00    Speaker: Adrian Sescu, Abdollah A. Afjeh, Carmen Sescu  
Title: Runge-Kutta Discontinuous Galerkin Method Applied to Nonlinear Tricomi  
Equation
- 09:00 – 09:20    Speaker: Sofiane Khelladi, Hakim El Hadjen, Xesus Nogueira, Farid Bakir,  
Mohamed Ouadjaout  
Title: Toward a High Order Unsteady Finite Volume Solver Based on Moving  
Least Squares Approximation Method: Application to Aeroacoustic Problems
- 09:00 – 09:20    Speaker: **Natalia Janson, Andrey Pototsky, Sandhya Patidar , Cancel**  
Title: **Stochastic neural networks and their control**

---

---

**11:30 – 12:30            LUNCH, Georgia Center**

**THE END OF THE PROGRAM**

---