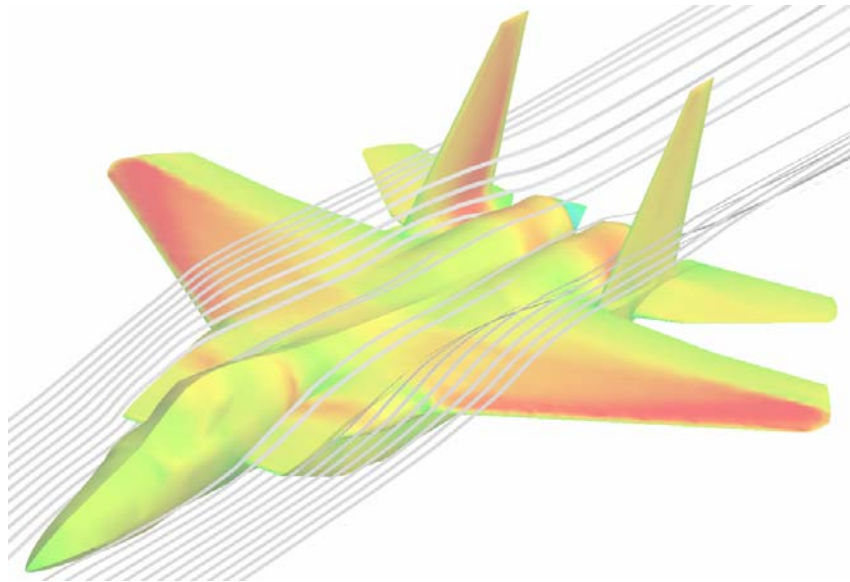


Program

The Seventh Mississippi State – UAB Conference on Differential Equations and Computational Simulations



November 1-3, 2007

**DoubleTree Hotel
Birmingham, AL**

Organizing Committee

Main Organizers

Ratnasingham Shivaji, MSU-Math
Bharat Soni, UAB-ME

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Jianping Zhu, Univ. of Texas at Arlington-Math

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Travel Support Coordinator

Hyeona Lim, MSU-Math

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Conference Proceedings

Main Editors

John Graef, University of Tennessee at Chattanooga
Roy Koomullil, University of Alabama at Birmingham
Hyeona Lim, Mississippi State University
Ratnasingham Shivaji, Mississippi State University
Bharat Soni, University of Alabama at Birmingham
Jianping Zhu, University of Texas at Arlington

Associate Editors

Alfonso Castro, Harvey Mudd College
Gary Cheng, University of Alabama at Birmingham
Maya Chhetri, University of North Carolina at Greensboro
Hai Dang, Mississippi State University

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David Littlefield, University of Alabama at Birmingham
Seth Oppenheimer, Mississippi State University
Chuanxi Qian, Mississippi State University
Mohsen Razzaghi, Mississippi State University
Alan Shih, University of Alabama at Birmingham
James Ward, University of Alabama at Birmingham
Xiangsheng Xu, Mississippi State University

Wednesday, October 31, 2007

6:30PM-8:30PM	Registration/Reception Foyer, DoubleTree Hotel
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Thursday, November 1, 2007

7:30AM-5:30PM	Registration Foyer, DoubleTree Hotel
8:00AM-8:30AM	Opening Ceremony Introduction: Bharat Soni, Program Organizer Opening Remarks: Malcolm Potera, Chancellor, University of Alabama System Eli Capilouto, Provost, University of Alabama at Birmingham (UAB) Joe Thompson, Chair, Operations Board at High Performance Computing Collaboratory, MSU Richard B. Marchase, V.P. of Research & Economic Development, UAB Linda Lucas, Dean, School of Engineering, UAB Mohsen Razzaghi, Chair, Department of Mathematics and Statistics, MSU Program Announcements: Jianping Zhu, Program Chair
8:30AM-9:30AM	Principal Lecture 1: Heritage I “PDE Based Image Science,” Stanley Osher , Dept. of Mathematics, University of California, Los Angeles Chaired by: Jianping Zhu, University of Texas at Arlington
9:30AM-10:30AM	Principal Lecture 2: Heritage I “Computational Models – Pushing or Pulling the Realm of Experimental Biomechanics?” Jeff R. Crandall , Dept. of Mechanical and Aerospace Engineering, University of Virginia Chaired by: Bharat Soni, University of Alabama at Birmingham
10:30AM-10:45AM	Break

Session A1: Heritage I*Chair: Nitin Bhagat, University of Alabama at Birmingham*

10:45AM-11:05AM <i>Numerical Simulation of Radiative Heat Transfer by Solving Integro-Differential Equations</i>	11:05AM-11:25AM <i>Semiclassical Calculation of Vibrational Energy Relaxation Rates in Polar Liquids</i>	11:25AM-11:45AM <i>An Efficient Parallel Algorithm for Solving Fluid-Structure Interaction Problems</i>	11:45AM-12:05PM <i>Study of Data Interpolation for Overset Meshes: Flow-fields with Discontinuities</i>
Babila Ramamoorthy University of Alabama at Birmingham Co-authors: Gary Cheng, Roy Koomullil	Henry Boateng University of Michigan Co-authors: Eitan Geva, Robert Krasny	Ravishekar Kannan Iowa State University Co-authors: X.G. Tan, Z.J. Chen, S. Marella, A. Przekwas	Nitin Bhagat University of Alabama at Birmingham Co-author: Roy Koomullil

Session A2: Heritage II*Chair: Dung Le, University of Texas at San Antonio*

10:45AM-11:05AM <i>Positive Solutions for a Class of Infinite Semipositone Problems</i>	11:05AM-11:25AM <i>Multiple Positive Solutions for $n \times n$ p-Laplacian Systems with Combined Nonlinear Effects</i>	11:25AM-11:45AM <i>A Semilinear Wave Equation with Smooth Data and No Resonance Having no Continuous Solution</i>	11:45AM-12:05PM <i>Pattern Formation in Cross Diffusion Systems</i>
Jinglong Ye Mississippi State University Co-authors: Mythily Ramaswamy, Ratnasingham Shivaji	Jaffar Ali Shahul-Hameed Mississippi State University Co-author: Ratnasingham Shivaji	Alfonso Castro Harvey Mudd College Co-author: Jose Caicedo	Dung Le University of Texas at San Antonio Co-authors: Linh Nguyen, Toan Nguyen

Session A3: Centennial I*Chair: Eric R. Kaufmann, University of Arkansas at Little Rock*

<p>10:45AM-11:05AM <i>On a Singular Boundary Value Problem for a Nonlinear Differential Equation of Fractional Order</i></p> <p>Nickolai Kosmatov University of Arkansas at Little Rock</p>	<p>11:05AM-11:25AM <i>Infinitely Many Periodic Solutions of Nonlinear Wave Equations on S^n</i></p> <p>Jintae Kim Tuskegee University</p>	<p>11:25AM-11:45AM <i>Wave Front Solutions in the Theory of Boiling Liquids</i></p> <p>Ruediger Landes University of Oklahoma</p>	<p>11:45AM-12:05PM <i>Impulsive Dynamic Equations on a Time Scale</i></p> <p>Eric R. Kaufmann University of Arkansas at Little Rock Co-authors: Nickolai Kosmatov, Youssef N. Raffoul</p>
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Session A4: Centennial II*Chair: Mandar Kulkarni, University of Alabama at Birmingham*

<p>10:45AM-11:05AM <i>A Semi-discrete Biofilm Model</i></p> <p>Hassan Khassehkhani University of Guelph Co-author: H. J. Eberl</p>	<p>11:05AM-11:25AM <i>Asymptotic Decay of Solutions of the Homogeneous Navier-Stokes Equations</i></p> <p>Zdenek Skalak, Czech Technical University</p>	<p>11:25AM-11:45AM <i>The Lattice Boltzmann Method and its Applications</i></p> <p>Kang Jin Auburn University Co-author: A. J. Meir</p>	<p>11:45AM-12:05PM <i>A Sobolev Gradient Descent Algorithm for an Inverse Problem in Reflection Seismology</i></p> <p>Mandar Kulkarni Univ. of Alabama at Birmingham Co-author: Ian Knowles</p>
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Session A5: University*Chair: Vasilios Alexiades, University of Tennessee at Knoxville*

<p>10:45AM-11:05AM <i>Runge-Kutta Discontinuous Galerkin Schemes for a Model Constrained Evolution Problem</i></p> <p>Alexander Alekseenko California State University</p>	<p>11:05AM-11:25AM <i>Implementation of the Space Time Finite Volume Method on a One Dimensional Wave Maker</i></p> <p>Matthew Brozak University of Central Arkansas Co-author: Clarence Burg</p>	<p>11:25AM-11:45AM <i>Noise Modeling and PDE-based Denoising for Magnetic Resonance (MR) Imagery</i></p> <p>Aisha Alwehebi Mississippi State University Co-author: Seongjai Kim</p>	<p>11:45AM-12:05PM <i>Methane Hydrate Formation and Decomposition</i></p> <p>Vasilios Alexiades University of Tennessee</p>
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12:05PM-1:35PM	Lunch
1:35PM-2:35PM	Principal Lecture 3: Heritage I “Mathematical Models of the Biofluidmechanics of Reproduction,” Lisa Fauci , Dept. of Mathematics, Tulane University Chaired by: Chuanxi Qian, Mississippi State University
2:35PM-3:35PM	Principal Lecture 4: Heritage I “Finite Morse Index Solutions and the Branch of Positive Solutions of Exponential Problems,” Norman Dancer , School of Mathematics and Statistics, University of Sydney Chaired by: Alfonso Castro, Harvey Mudd College
3:35PM-3:50PM	Break

Session B1: Heritage 1 <i>Chair: Bela Soni, Mississippi State University</i>				
3:50PM-4:10PM <i>FEM (Finite Element Method) Simulations in Spring Mass Lattice Modeling in Elastic Structure with Defects</i>	4:10PM-4:30PM <i>Performance Enhancement of ATM Software</i>	4:30PM-4:50PM <i>Computational Simulation of Aerodynamics and Dynamics of Wind Turbines</i>	4:50PM-5:10PM <i>Effects of Inlet Velocity Profile on Flows in Multigenerational Bronchial Tubes</i>	5:10PM-5:30PM <i>Simultaneous Effects of Nonplanarity and Asymmetry on Small Bronchial Tube Flows and Microparticle Transport</i>
JigarKumar Patel University of Texas at Dallas	Bharat Bhushan Sagar Dr K.N. Modi Institute of Engineering & Technology	Dmytro Redchyts` Institute of Transport Systems and Technologies of National Academy of Sciences of Ukraine	Charla Lindley Mississippi State University Co-authors: Bela Soni, David Thompson	Bela Soni Mississippi State University Co-authors: Charla Lindley, David Thompson

Session B2: Heritage 2*Chair: Jon Jacobsen, Harvey Mudd College*

<p>3:50PM-4:10PM <i>Existence and Regularity of Solutions to Doubly Nonlinear Diffusion Equations</i></p> <p>Jochen Merker University of Rostock</p>	<p>4:10PM-4:30PM <i>Drift-Diffusion Model for Semiconductors with Temperature</i></p> <p>Xiangsheng Xu Mississippi State University</p>	<p>4:30PM-4:50PM <i>Positive Radial Solutions to an Exterior Elliptic Boundary-value Problem: Application to the Hamiltonian Constraint Equation in General Relativity</i></p> <p>Nicolae Tarfulea Purdue University Calumet</p>	<p>4:50PM-5:10PM <i>Nontrivial Critical Groups in p-Laplacian Systems</i></p> <p>Kanishka Perera Florida Institute of Technology</p>	<p>5:10PM-5:30PM <i>Traveling Waves and Shocks in a Viscoelastic Generalization of Burgers Equation</i></p> <p>Jon Jacobsen Harvey Mudd College Co-authors: Victor Camacho, Robert Guy</p>
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Session B3: Centennial I*Chair: John R. Graef, University of Tennessee at Chattanooga*

<p>3:50PM-4:10PM <i>A Dirichlet m-Point Boundary Value Problem with a p-Laplacian Like Operator</i></p> <p>Chaitan Gupta University of Nevada Co-authors: M. Garcia-Huidobro, R. Manasevich</p>	<p>4:10PM-4:30PM <i>Second Order Differential Equations with Asymptotically Small Dissipation</i></p> <p>Hans Engler Georgetown University Co-authors: Alexandre Cabot, Sebastien Gadat</p>	<p>4:30PM-4:50PM <i>Spectrum for One-dimensional p-Laplacian with a Singular Weight</i></p> <p>Yong-Hoon Lee Pusan National University</p>	<p>4:50PM-5:10PM <i>A Model for Gene Activation</i></p> <p>Seth F. Oppenheimer Mississippi State University Co-authors: Stephen Pruett, Ruping Fan</p>	<p>5:10PM-5:30PM <i>Existence of Positive and Negative Solutions of a Nonlinear Periodic Boundary Value Problem</i></p> <p>John R. Graef University of Tennessee at Chattanooga Co-author: Lingju Kong</p>
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Session B4: Centennial II*Chair: Eugene Eckstein, University of Memphis*

<p>3:50PM-4:10PM <i>A Quantitative Property of Arnold's Resonance Tongues</i></p> <p>Oleg Makarenkov Research Institute of Mathematics</p>	<p>4:10PM-4:30PM <i>Singular Limits of Reaction Diffusion Equations of Kpp Type in an Infinite Cylinder</i></p> <p>Fernando Carreon Arizona State University</p>	<p>4:30PM-4:50PM <i>Levinson Theorem for 2 x 2 System and Applications to the Asymptotic Stability and Schrodinger Equation</i></p> <p>Gro Hovhannisyan Kent State University</p>	<p>4:50PM-5:10PM <i>Gradient Estimates for the Perfect Conductivity Problem</i></p> <p>Ellen Shiting Bao Rutgers University Co-authors: YanYan Li, Biao Yin</p>	<p>5:10PM-5:30PM <i>Suspension Flows and Stochastic Models: Ways to Capture the Continuing Nature and Internal Organization</i></p> <p>Eugene Eckstein University of Memphis Co-authors: Jerome Goldstein, Vinay Bhal</p>
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Session B5: University*Chair: Clarence Burg, University of Central Arkansas*

<p>3:50PM-4:10PM <i>A Finite Volume Element Method With Bilinear Immersed Finite Elements</i></p> <p>Xiaoming He Virginia Tech Co-author: Tao Lin</p>	<p>4:10PM-4:30PM <i>A Numerical Method and its Demo on Finding Multiple Unstable Solutions to Nonlinear Variational Systems</i></p> <p>Xianjin Chen Texas A&M Univeristy, College Station Co-author: Jianxin Zhou</p>	<p>4:30PM-4:50PM <i>An Essentially Non-Oscillatory Crank-Nicolson Procedure for Incompressible Navier-Stokes Equations</i></p> <p>Chung-Ki Cho Soonchunhyang University Co-author: Seongjai Kim</p>	<p>4:50PM-5:10PM <i>Application of Richardson Extrapolation to the Two Dimensional Shallow Water Equations</i></p> <p>Taylor Erwin University of Central Arkansas Co-author: Clarence Burg</p>	<p>5:10PM-5:30PM <i>Application of Richardson Extrapolation to the Numerical Solution of Partial Differential Equations</i></p> <p>Clarence Burg University of Central Arkansas Co-author: Taylor Erwin</p>
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6:30PM-8:30PM

Reception - UAB Business and Engineering Complex (BEC) Lobby

Friday, November 2, 2007

7:30AM-5:30PM	Registration
8:00AM-9:00AM	<p>Principal Lecture 5: Heritage I</p> <p>“High Order Discontinuous Galerkin Methods for Aerodynamics,” Jaime Peraire, Dept. of Aeronautics and Astronautics, Massachusetts Institute of Technology</p> <p>Chaired by: Padmanabhan Seshaiyer, George Mason University</p>
9:00AM-10:00AM	<p>Principal Lecture 6: Heritage I</p> <p>“High Performance Computing at the Army Research Laboratory - Impact of Cluster technology,” Charles J. Nietubicz, Army Research Laboratory</p> <p>Chaired by: David L. Littlefield, University of Alabama at Birmingham</p>
10:00AM-10:15AM	Break

<p>Session C1: Heritage I</p> <p><i>Chair: Kshitij Neroorkar, University of Alabama at Birmingham</i></p>				
<p>10:15AM-10:35AM</p> <p><i>Optimized Difference Schemes for Multidimensional Hyperbolic PDEs</i></p> <p>Adrian Sescu University of Toledo Co-authors: Ray Hixon, Abdollah A. Afjeh</p>	<p>10:35AM-10:55AM</p> <p><i>A Computational Domain Decomposition Approach for Solving Coupled Flow-Structure-Thermal Interactions</i></p> <p>Padmanabhan Seshaiyer George Mason University Co-authors: Eugenio Aulisa, Sandro Manservigi</p>	<p>10:55AM-11:15AM</p> <p><i>Dynamic Simulation of Biofilm Sloughing Event using a Finite Element based CFD Code</i></p> <p>Rangarajan Sudarsan University of Guelph Co-author: Herman J. Eberl</p>	<p>11:15AM-11:35AM</p> <p><i>Development of a Coupled Code for Modeling Detonation Phenomena</i></p> <p>David L. Littlefield University of Alabama at Birmingham Co-author: Young-Ho Kim</p>	<p>11:35AM-11:55AM</p> <p><i>Numerical Study of Turbulence Transition Models</i></p> <p>Kshitij Neroorkar University of Alabama at Birmingham Co-author: Gary Cheng</p>

Session C2: Heritage II*Chair: Jim Ward, University of Alabama at Birmingham*

<p>10:15AM-10:35AM <i>Continuous-Time Mathematical Modeling of Transgenes Mosquitoes in Preventing Malaria Transmission</i></p> <p>Jia Li University of Alabama in Huntsville</p>	<p>10:35AM-10:55AM <i>Mathematical and Biological Consequences of Aggregative Behavior near Habitat Boundaries</i></p> <p>Robert Stephen Cantrell The University of Miami Co-author: Chris Cosner</p>	<p>10:55AM-11:15AM <i>Traveling Waves in Diffusive Ross-Macdonald Type Host-Vector Models</i></p> <p>Shigui Ruan University of Miami</p>	<p>11:15AM-11:35AM <i>Global Existence for a Model of Chemotaxis</i></p> <p>Glenn Webb Vanderbilt University Co-authors: Janet Dyson, Rosanna Vilella-Bressan</p>	<p>11:35AM-11:55AM <i>A Degenerate Reaction Diffusion System modeling the Atmospheric of Pollutants</i></p> <p>William Fitzgibbon University of Houston Co-authors: Michel Langlais, Jeff Morgan</p>
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Session C3: Centennial I*Chair: Xiaoqin Wu, Mississippi Valley State University*

<p>10:15AM-10:35AM <i>A Chemostat Model of Resource Competition and Allelopathy</i></p> <p>Ian P. Martines University of Texas at Arlington Co-authors: Hristo V. Kojouharov, James P. Grover</p>	<p>10:35AM-10:55AM <i>Bounded Solutions of Nonlinear Parabolic Systems</i></p> <p>Nsoki Mavinga University of Alabama at Birmingham Co-author: Mubenga Nkashama</p>	<p>10:55AM-11:15AM <i>Positive Solutions of Sublinear Elliptic Systems</i></p> <p>Haiyan Wang Arizona State University</p>	<p>11:15AM-11:35AM <i>Solutions of Higher Order Boundary Value Problems</i></p> <p>Lingju Kong University of Tennessee at Chattanooga Co-authors: John R. Graef, Qingkai Kong</p>	<p>11:35AM-11:55AM <i>Existence for the Thermoelastic Semiconductor Equations</i></p> <p>Xiaoqin Wu Mississippi Valley State University</p>
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Session C4: Centennial II*Chair: Vladimir Varlamov, University of Texas - Pan American*

10:15AM-10:35AM <i>The Design of Axisymmetric Ducts for Incompressible Flow with Blockage Effects and Body Forces</i> Vasos Pavlika University of Westminster	10:35AM-10:55AM <i>Traces of Functions in Hardy Spaces on Nonsmooth Domains and Applications to Compensated Compactness</i> Tunde Jakab University of Virginia Co-authors: Irina Mitrea, Marius Mitrea	10:55AM-11:15AM <i>Properties of the Solutions of Hyperbolic Stochastic Partial Differential Equations</i> Oleksiy Ignatyev Michigan State University Co-author: Hassan Allouba	11:15AM-11:35AM <i>Nonlinear Schrödinger Equation with Bound States of Higher Multiplicities</i> Theresa N. Busse University of Texas at Arlington	11:35AM-11:55AM <i>Airy-type Solutions for Korteweg-de Vries Equation</i> Vladimir Varlamov University of Texas - Pan American
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Session C5: University*Chair: Alfonso Limon, Claremont Graduate University*

10:15AM-10:35AM <i>Finite Difference Methods for Coupled Flow Interaction Transport Models</i> Shelly McGee Texas Tech University Co-author: Padmanabhan Seshaiyer	10:35AM-10:55AM <i>Spectral Element Simulation of Flow past an Ellipsoid at Different Reynolds Numbers</i> Don Liu Louisiana Tech University	10:55AM-11:15AM <i>Divergence Free Finite Element Methods for the Navier-Stokes Equations by $H(\text{div})$ Elements</i> Xiu Ye University of Arkansas at Little Rock Co-author: J. Wang	11:15AM-11:35AM <i>A Conservative Higher Order Runge-Kutta Discontinuous Galerkin Method for Gas Kinetic Equations</i> Andrey Mirzoyan California State University Northridge Co-authors: Alexander Alekseenko, Alina Alexeenko	11:35AM-11:55AM <i>Multilevel Solver for Discrete PDEs on kD-Trees</i> Alfonso Limon Claremont Graduate University Co-author: Hedley Morris
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11:55AM-1:30PM	Lunch
1:30PM-2:30PM	Principal Lecture 7: Heritage I “Gradient Estimates for Elliptic Equations and Systems from Composite Material,” Yanyan Li , Rutgers University Chaired by: Xiangsheng Xu, Mississippi State University
2:30PM-3:30PM	Principal Lecture 8: Heritage I “ODE-based Multiscale Approach to Modeling Cardiac Contraction,” John Rice , IBM T.J. Watson Research Center Co-authors: Jagir Hussan, Yuhia Tu, Gustavo Stolovitzky, and Pieter de Tombe Chaired by: Gary Cheng, University of Alabama at Birmingham
3:30PM-3:45PM	Break
3:45PM-4:45PM	Principal Lecture 9: Heritage I “Two Variational Problems with the p-Laplacian: a Stationary Cahn-Hilliard Model and the Fredholm Alternative near the First Eigenvalue,” Peter Takac , Institute for Mathematics, University of Rostock Chaired by: Hai Dang, Mississippi State University

Session D1: Heritage I <i>Chair: Wenyan Liao, University of Calgary</i>		
4:45PM-5:05PM <i>Biochemical Reaction Instigating Vision – Sensitivity on Parameters and Optimization of the Output Based on Them</i> Sophonie K. Tchoua University of Tennessee Co-author: Vasilios Alexiades	5:05PM-5:25PM <i>On the Spurious Solutions in the High Order Finite Difference Methods for Eigenvalue Problems</i> Shan Zhao University of Alabama	5:25PM-5:45PM <i>A High Order Compact Finite Difference Scheme for Solving Convection-Diffusion-Reaction Equation</i> Wenyan Liao University of Calgary Co-author: Jianping Zhu

Session D2: Heritage II*Chair: Yi Li, University of Iowa***4:45PM-5:05PM***Principal Eigenvalue for a Quasilinear Elliptic Problem in an Unbounded Domain*Yechoui Akila
ICTP**5:05PM-5:25PM***Boundary Blow-up Solutions to a Class of Semilinear Elliptic Equations*Peng Feng
Florida Gulf Coast University**5:25PM-5:45PM***Stability of Travelling Waves with Noncritical Speeds for Double Degenerate Fisher-Type Equations*Yi Li
University of Iowa
Co-author: Yaping Wu**Session D3: Centennial I***Chair: Hubertus von Bremen, California State Polytechnic University-Pomona***4:45PM-5:05PM***Long-Time Behavior of Solutions to a Model of Three Species*Zhenbu Zhang
Jackson State University**5:05PM-5:25PM***Travelling Solution of a Variational Wave Equation on Two Space Dimension*Tae-Wan Park
Grand Valley State University**5:25PM-5:45PM***Stability in a Population Model with Transgenic Mosquitoes*Hubertus von Bremen
California State Polytechnic University-Pomona
Co-author: Robert Sacker**Session D4: Centennial II***Chair: Katharine Ott, University of Virginia***4:45PM-5:05PM***Lipschitz-Convex Programming Problems governed by Nonlinear Elliptic PDEs*M.D. Voisei
Towson University**5:05PM-5:25PM***A Boundary Control Problem with a Nonlinear Reaction Term*M. Salman
Tuskegee University
Co-author: John R. Cannon**5:25PM-5:45PM***Spectral Theory for the Maxwell System of Equations*Katharine Ott
University of Virginia
Co-author: Irina Mitrea

Session D5: University <i>Chair: Babila Ramamoorthy, University of Alabama at Birmingham</i>		
4:45PM-5:05PM <i>Steady Flow of Non-Newtonian Fluid with Pressure/Temperature Dependent Viscosity in a Generalized Couette Flow</i> Adesanya Samuel Olumide Olabisi Onabanjo University Co-authors: R.O. Ayeni, O.O. Otolorin	5:05PM-5:25PM <i>Study of the Flutter of a “Hereditary-Deformable” Airfoil</i> F.B. Badalov Tashkent State Aviation Institute Co-author: B.Sh Usmonov	5:25PM-5:45PM <i>Modifying a Plasma System with an Energy Equation in 2D</i> R. Naidoo DUT
6:30PM-9:30PM	Banquet at the McWane Science Center	

Saturday, November 3, 2007

7:30AM-2:00PM	Registration
8:00AM-9:00AM	Principal Lecture 10: Heritage I “Fast High-Order High-Frequency Solvers in Computational Acoustics and Electromagnetics,” Oscar P. Bruno , Applied and Computational Mathematics, California Institute of Technology Chaired by: Jianping Zhu, University of Texas at Arlington
9:00AM-10:00AM	Principal Lecture 11: Heritage I “Mathematical Aspects of the Ideal Free Distribution,” Chris Cosner , Dept. of Mathematics, University of Miami Co-authors: R.S. Cantrell, D. DeAngelis, Y. Lou, M. Kshatriya, and V. Padron Chaired by: Seth Oppenheimer, Mississippi State University
10:00AM-10:15AM	Break
10:15AM-11:15AM	Principal Lecture 12: Heritage I “Bounded Solutions: Differential vs Difference Equations,” Jean Mawhin , Universite Catholique de Louvain Co-author: J.B. Baillon Chaired by: Jim Ward, University of Alabama at Birmingham

11:15AM-11:30AM	Remarks by organizers (Ratnasingham Shivaji - MSU and Roy Koomullil - UAB)
11:30AM-12:30PM	<p>Principal Lecture 13: Heritage I</p> <p>“Coupled Contagion Dynamics of Fear and Disease: Mathematical and Computational Explorations,” Joshua M. Epstein, Director, Center on Social and Economic Dynamics, The Brookings Institution</p> <p>Co-authors: Jon Parker, Derek Cummings, and Ross A. Hammond</p> <p>Chaired by: Roy Koomullil, University of Alabama at Birmingham</p>
12:30PM-2:00PM	Lunch

<p>Session E1: Heritage I</p> <p><i>Chair: Seongjai Kim, Mississippi State University</i></p>				
<p>2:00PM-2:20PM</p> <p><i>Global Multiscale Finite Methods for Acoustic Wave Equations with Continuum Spatial Scales</i></p> <p>Lijian Jiang Texas A&M University Co-authors: Y. Efendiev, V. Ginting</p>	<p>2:20PM-2:40PM</p> <p><i>The Numerical Solution of a Differential Equation of Steepest Descent in Non-Hilbert Sobolev Spaces and Applications</i></p> <p>Ivie Stein Jr. The University of Toledo</p>	<p>2:40PM-3:00PM</p> <p><i>Finite Element Method on Arbitrary Surfaces</i></p> <p>Necibe Tuncer Georgia State University</p>	<p>3:00PM-3:20PM</p> <p><i>Multiwavelet Representation of Functions and Operators</i></p> <p>Chuan Li University of Tennessee</p>	<p>3:20PM-3:40PM</p> <p><i>Speckle-Mowing Anisotropic Diffusion for Geospatial Imagery</i></p> <p>Seongjai Kim Mississippi State University Co-author: Jinmu Choi</p>

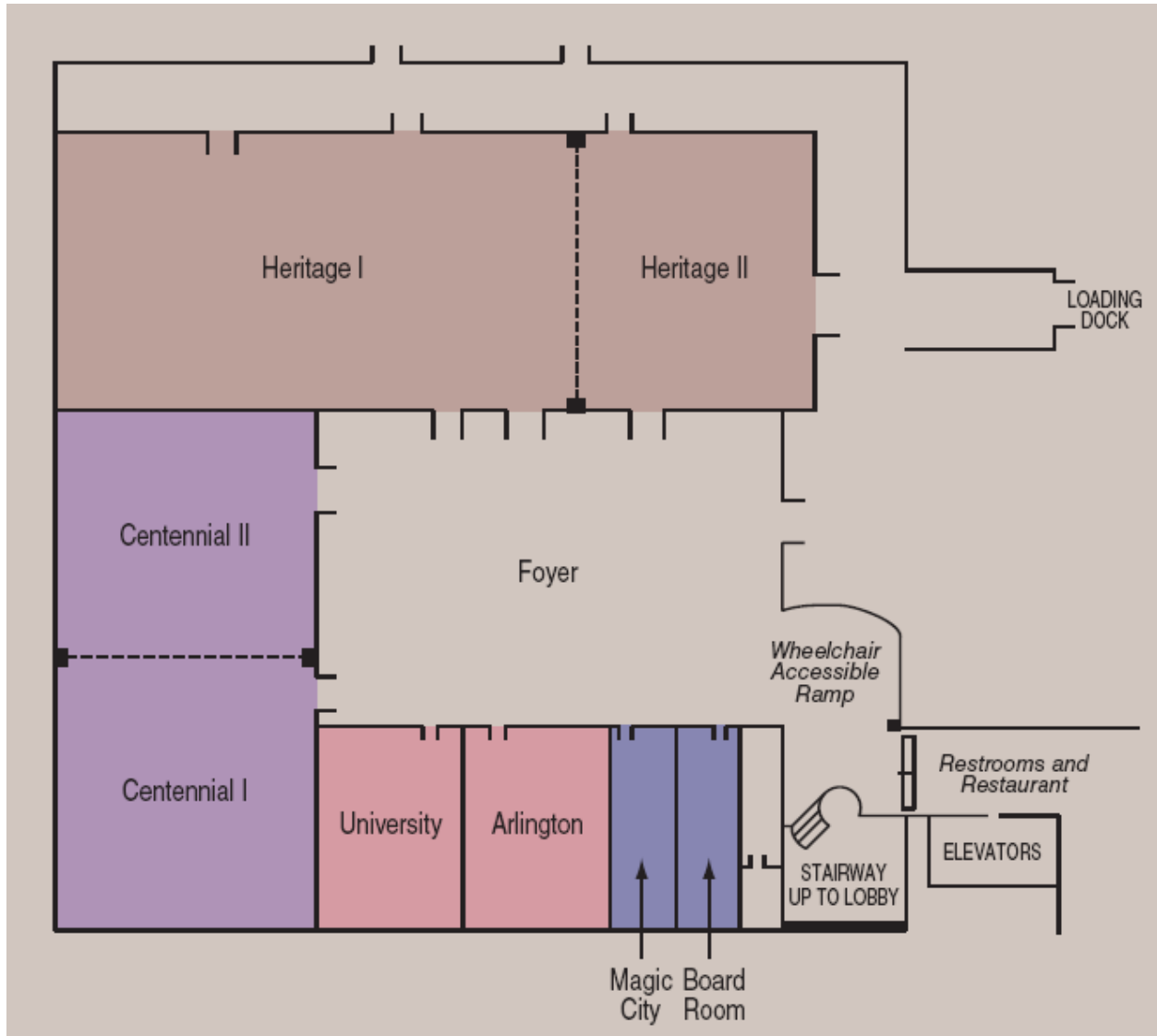
<p>Session E2: Heritage II</p> <p><i>Chair: Maya Chhetri, University of North Carolina at Greensboro</i></p>				
<p>2:00PM-2:20PM</p> <p><i>Existence, Nonexistence and Multiplicity of Solutions for Singular p-Laplacian Problem</i></p> <p>Inbo Sim Pusan National University Co-author: Yong-Hoon Lee</p>	<p>2:20PM-2:40PM</p> <p><i>Existence Results for Quasilinear Semipositone Equations on Bounded Domains</i></p> <p>Matthew Rudd University of Idaho</p>	<p>2:40PM-3:00PM</p> <p><i>Global Existence of Multiple Positive Solutions for Two-point Boundary Value Problems for p-Laplacian System</i></p> <p>Eun Kyoung Lee Pusan National University</p>	<p>3:00PM-3:20PM</p> <p><i>An Existence Result for a Singular Semipositone Problem</i></p> <p>Stephen Robinson Wake Forest University Co-author: Maya Chhetri</p>	<p>3:20PM-3:40PM</p> <p><i>Multiplicity of Positive Solutions for a Class of Singular Elliptic PDEs</i></p> <p>Maya Chhetri University of North Carolina at Greensboro Co-author: S. B. Robinson</p>

Session E3: Centennial I				
<i>Chair: David Hartenstine, Western Washington University</i>				
2:00PM-2:20PM <i>Traveling Wave Solutions to a Reaction-Diffusion System</i>	2:20PM-2:40PM <i>Traveling Wave Solutions for a Competitive Reaction-Diffusion System</i>	2:40PM-3:00PM <i>Traveling Pulse Solutions for a Nonlocal Reaction-Diffusion Equation</i>	3:00PM-3:20PM <i>Brunn-Minkowski Type Inequalities Related to the Monge-Ampère Equation</i>	3:20PM-3:40PM
Zhaosheng Feng University of Texas-Pan American	Xiaojie Hou University of North Carolina at Wilmington	Joaquin Rivera Arizona State University Co-author: Yi Li	David Hartenstine Western Washington University	

Session E4: Centennial II				
<i>Chair: H. J. Eberl, University of Guelph</i>				
2:00PM-2:20PM <i>Computing Blow-up Solutions</i>	2:20PM-2:40PM <i>Spectral Theory of Functions and Stability and Asymptotic Behavior of Evolution Equations</i>	2:40PM-3:00PM <i>Optimal Flexibility in Flapping Appendages</i>	3:00PM-3:20PM <i>A Bioclogging Model that Accounts for Spatial Spreading of Bacterial Populations and its Effect on Flow Dynamics</i>	3:20PM-3:40PM
Amin Boumenir University of West Georgia	Nguyen Van Minh University of West Georgia	Silas Alben Georgia Tech	H. J. Eberl University of Guelph Co-authors: M. A. Efendiev, L. Demaret	

Conference Meeting Location: Floor Plan

The conference meetings will be held on the ground floor of the DoubleTree Hotel.



The Seventh Mississippi State – UAB Conference on DIFFERENTIAL EQUATIONS and COMPUTATIONAL SIMULATIONS

Brief Biography of Principal Speakers

Oscar P. Bruno, Professor of Applied and Computational Mathematics, California Institute of Technology (Caltech). Dr. Bruno received his Ph.D. from the New York University in 1989. His research interests are in the areas of optics, elasticity and electromagnetism, remote sensing, radar, overall electromagnetic and elastic behavior of materials (solid, fluids, composites materials, multiple-scale geometries), and phase transitions. He graduated with a Friedrichs Award for an outstanding dissertation in mathematics from the Courant Institute. He is also the recipient of a Young Investigator Award from the National Science Foundation (NSF) and a Sloan Foundation Fellowship.

Chris Cosner, Professor of Mathematics at the University of Miami. Dr. Cosner received his Ph.D. in Mathematics from the University of California, Berkley in 1977 and has been on the faculty of the University of Miami for over 20 years. He also held visiting positions at the Institute for Advanced Studies, Texas A & M University, and the University of Tennessee. His research focuses on studying mathematical models for the ways that organisms interact with each other, humans, and the environment, especially in their utilization of space. He has published extensively and made numerous presentations in these research areas. His research has been funded by NSF continuously for 20 years. He recently co-authored the book titled “Spatial Ecology on Reaction – Diffusion Equation,” John–Wiley & Sons Ltd.

Jeff Crandall, Professor of Mechanical and Aerospace Engineering and Biomedical Engineering at the University of Virginia. Dr. Crandall also serves as the Director of the University’s Center for Applied Biomechanics. His research focuses on understanding the human body’s response and injury mechanisms during dynamic loading with applications in the areas of impact biomechanics, transportation safety, orthopedic studies, military and blast trauma, and sports-related injuries. He is a fellow of the Society of Automotive Engineers and the Association for the Advancement of Automotive Medicine and a member of the board for the International Research Committee on the Biomechanics of Injury. He has authored more than 350 technical papers and has received numerous awards, including the United States Government Award for Engineering Excellence.

Norman Dancer, Professor of Mathematics in the School of Mathematics and Statistics at the University of Sydney. Dr. Dancer received his Ph.D. in Mathematics from the University of Cambridge in 1972 and was elected a Fellow of the Australian Academy of Science (FAA) in 1996. He also received a Research Award of the Humboldt Foundation in 2004. He has given plenary lectures at international meetings in many countries, including the USA, Canada, UK, France, Germany, Italy and Spain. He is currently on the editorial board of a number of journals including Abstract and Applied Analysis, Advanced Nonlinear Studies, Advances in Differential Equations, Communications in Applied Nonlinear Analysis, and Topological Methods in Nonlinear Analysis.

Joshua M. Epstein, Director of the Center on Social and Economic Dynamics and Senior Fellow in Economic Studies at the Brookings Institution. Dr. Epstein received his Ph.D. from the Massachusetts Institute of Technology. His area of expertise is the modeling of complex social, economic and biological systems using agent-based computational models and nonlinear dynamical systems. He has published widely in the modeling area, with scholarly articles on economics, epidemiology, archaeology, game theory, and civil violence. He is a member of the External Faculty of the Santa Fe Institute and the New York Academy of Sciences and has taught mathematical and computational modeling at Princeton and the Santa Fe Institute Summer School.

Lisa Fauci, Professor of mathematics at Tulane University. Dr. Fauci was the funding director of the Center for Computational Science at Tulane and Xavier University from 2001 to 2003 and has been the Center's Associate Director since 2003. She received her Ph.D. in mathematics from the New York University in 1986 and has been on the faculty at Tulane University since then. She was a Sloan Research Fellow from 1992 - 1994. She has published extensively and given numerous invited talks in mathematical biology and computational science. Her research has been supported by major grants from NSF and NIH.

Yanyan Li, Professor of Mathematics at Rutgers University. Dr. Li received his Ph.D. in mathematics from the New York University in 1988 and has been at Rutgers University since 1990. He also held numerous visiting and adjunct positions in China, France, Italy, and the US. His work in the analysis of PDEs has been well-recognized. He was an invited speaker at the 2002 International Congress of Mathematics and a Sloan Research Fellow from 1993 - 1995. His research has been funded by NSF for almost twenty years.

Jean L. Mawhin, Professor of Mathematics, Université de Louvain. Dr. Mawhin received Docteur en sciences (mathématiques) in 1969 from Université de Liege. His research focuses on nonlinear differential equations, nonlinear functional analysis, critical point theory, real analysis, and history of mathematics. He received the Alexander von Humboldt Award for the scientific cooperation between Belgium and West-Germany (1990-1991), the Mathematical Medal of the Union of Czechoslovak Mathematicians and Physicists (1990), and the Bolzano Mathematical Medal of the Czech Academy of Science (2002). He is a Fellow of the Royal Academy of Belgium (President in 2002), an Honorary Fellow of the Institute of Luxembourg, a Foreign Fellow of the Russian Academy of Natural Sciences, and a Foreign Fellow of the Accademia Toscana 'La Colombaria.

Charles J. Nietubicz, Director of the Major Shared Resource Center (MSRC) and Chief of the Army Research Laboratory High Performance Computing Division at Aberdeen, MD. Mr. Nietubicz received his B.S. and M.M.E. degrees in Mechanical Engineering from the University of Dayton in 1969 and 1970, respectively. As the Chief of the Advanced Computing and Computational Sciences Division, he is responsible for 220 employees and an annual operating budget of over \$70M. His Division has technical responsibility in areas of scientific computing, computational science and engineering, networking, system administration and information assurance. He is a Fellow of the AIAA and has over 150 publications and presentations in the areas of Computational Aerodynamics, High Performance Computing, and Scientific Visualization. He has received two Army Science Research and Development Achievement

awards, the bronze medal for achievement at the Army Science Conference, the Army Superior Civilian Service Award and the Army Meritorious Civilian Service Award.

Stanley Osher, Professor of Mathematics and Director of Applied Mathematics at University of California, Los Angeles. Dr. Osher is also Director of Special Projects for the NSF supported Institute for Pure and Applied Mathematics (IPAM). He is a member of the National Academy of Science. He received his Ph.D. in Mathematics from New York University in 1966 and has been a faculty member at UCLA since 1977. Over the last forty years, he has made significant contributions to the analysis and numerical solutions of PDEs and scientific computing. He has received numerous honors for his outstanding research contributions and his effort to promote the public awareness and understanding of mathematics. Among his very recent honors and awards are the 2007 USACM Computational and Applied Sciences Award, Docteur Honoris Causa from ENS Cachan, France, the SIAM Kleinman Prize, and the 2003 ICIAM Pioneer Prize.

Jaime Peraire, Professor of Aeronautics and Astronautics at the Massachusetts Institute of Technology and Director of the Aerospace Computational Design Laboratory. Dr. Peraire is also the co-director of the new MIT SM program in Computation for Design and Optimization (CDO). He received his PhD in 1986 from the University of Wales (UK) and has been on the faculty at MIT since 1993. His areas of research interest are computational aerodynamics, computational mechanics, and optimization. His current research focuses on high order discontinuous Galerkin methods for CFD, flapping flight and computational mechanics. He was the originator of the FLITE code, which is the main unstructured CFD analysis code in use at British Aerospace and Rolls Royce in the UK. He also led the development of the FELISA code for re-entry aerodynamics, which is still in use at NASA Langley. He has received several awards, including The Research Corporation Trust Award (1986), two NASA exceptional achievement awards (1989 and 1997), and the Outstanding Young Researcher Award in Computational Mechanics (1998).

John Rice, Research Staff Member at the Center for Computational Biology at IBM's Thomas J. Watson Research Center. Dr. Rice received his Ph.D from John Hopkins University in 1998. He is currently working on methods to infer cellular signaling pathways from high-throughput data. He has published extensively in the field of simulation of cardiac physiology including models of electrophysiology, calcium signaling and the cellular machinery that allows heart cells to contract. He has two patents in the area of modeling biological systems. He is a member of the Biophysical Society. He has contributed to numerous government initiatives in biological modeling, including the Integrated Human Function Team of the National Aeronautics and Space Administration (NASA) and the Microbial Cell Project of the Department of Energy (DOE).

Peter Takáč, Chair Professor of Applied Analysis at Universität Rostock, Germany. Dr. Takáč received his Ph.D. in Mathematics from the University of Minnesota in 1986. Prior to joining Universität Rostock, he held faculty positions at Vanderbilt University, Emory University, and Washington State University. His research focuses on partial differential equations and modern functional analytic methods with applications to degenerate and singular diffusion equations, nonlinear eigenvalue problems with the p -Laplacian, the complex Ginzburg - Landau equations, superconductivity, infinite dimensional dynamical systems with some monotonicity properties,

nonlinear growth - dispersion population models, the nonlinear Boltzmann equation, and strongly continuous semigroups of positive operators. His research has been funded by the NSF from 1987 - 1996 and by the German Research Society from 1997 to present.