PROGRAM for The 40th SIAM Southeastern Atlantic Section Conference (SIAM-SEAS)

ATHENS, GA
MARCH 12-13, 2016

FRIDAY, MARCH 11, 2016
05:00 – 07:00  REGISTRATION (Science Library, BOYD GSRC)
05:00 – 07:00  RECEPTION

SATURDAY, MARCH 12, 2016
07:00 – 12:00  REGISTRATION
08:00 – 08:10  WELCOME, Masters Hall
               Thiab Taha/Program Chair and Conference Coordinator

08:10 – 09:10  KEYNOTE LECTURE: keynote - I, MLC 101
               Robert Pego: Euler sprays and optimal transportation
               Chair: Thiab Taha

09:10 – 09:40  COFFEE BREAK

09:40 – 11:00  SESSION 13, MLC 101: Inverse Problems and Imaging - II- Part I/II
               Chair: Shitao Liu and Yuyuan Ouyang
09:40 – 10:00  Linda DeCamp: Inverse problems and Ebola virus disease using an age of infection mode
10:00 – 10:20  Alex Smirnova: The study of data-driven heuristic methods for the selection of a regularization
               parameter motivated by inverse problems in epidemiology
10:20 – 10:40  Sung Ha Kang: Illusory contour and curvature computation
10:40 – 11:00  Khanh Dinh and Roger Sidje: Solving the chemical master equation with time varying
               Parameters

09:40 – 11:00  SESSION 1, MLC 147: Recent Advances in Numerical Methods for Fluid Flow with
               applications - Part I/V
               Chair: Leo Rebholz and Zhu Wang
09:40 – 10:00  Shan Zhao: Time domain interface methods for electromagnetic wave propagation in dispersive
               Media
10:00 – 10:20  James Munch: An accurate effective method for solving flow rate boundary problems in
               incompressible unsteady fluid dynamics
10:20 – 10:40  Everly Lunasin: Data Assimilation algorithm for 3D B\'enard convection in porous media employing only
               temperature measurements
10:40 – 11:00  Javier Ruiz-Ramirez: Time-dependent Stokes-Darcy flow with deposition

09:40 – 11:00  SESSION 2, MLC 153: Fast Algorithm in PDE and Their Applications - Part I/II
               Chair: Zhan Chen and Duan Chen
09:40 – 10:00  Shan Zhao: Time domain interface methods for electromagnetic wave propagation in dispersive
               Media
10:00 – 10:20  Lunji Song: Polynomial Preserving Recovery of An Over-Penalized Symmetric Interior Penalty Galerkin
               Method for Elliptic Problems
10:20 – 10:40  Lin Mu: Weak Galerkin Finite Element Methods for Brinkman Equations
10:40 – 11:00  Duan Chen: Modeling and computation of heterogeneous implicit solvent and its applications for
               biomolecules
09:40–11:00 **SESSION 4**, MLC 207: Fluids: modeling, analysis and simulation - Part I/IV
  Chair: Xiaoming Wang, Nick Moore, Mark Sussman
  09:40–10:00 Daniel Harris: Pilot-wave hydrodynamics in a rotating frame
  10:00–10:20 Mark Sussman: An adaptive coupled levelset and moment-of-fluid method for simulating droplet impact and icing on solid surfaces
  10:40–11:00 Huy Vo and Roger Sidje: Solving the chemical master equations by adaptive methods

09:40–11:00 **SESSION 6**, MLC 245: PDEs for Fluid Mechanics with Applications in Medical Biology - Part I/III
  Chair: Bikash Das, Thinh Kieu, Ryan Thompson
  09:40–10:00 Layachi Hadji: Rayleigh-Benard convection induced by a basic temperature profile whose unstable part is infinitely thin
  10:00–10:20 Noufe Aljhadaly: The Rayleigh-Bénard-Rayleigh-Taylor problem in tall cavities
  10:20–10:40 John Holmes: The periodic Cauchy problem for the Hunter-Saxton equation
  10:40–11:00 Amy Buchmann: Flow Induced by Bacterial Carpets and Transport of Microscale Loads

09:40–11:00 **SESSION 7**, MLC 267: Mathematics in the medical field: theory, applications and numerical simulations - Part I/II
  Chair: Ana-Maria Croicu, Philippe Laval
  09:40–10:00 Michele Joyner: Modeling the Effect of Body Mass Index on Blood Concentration Levels for Three Different Antibiotics
  10:00–10:20 Richard Schugart: Connecting Local and Global Sensitivities in a Mathematical Model for Wound Healing
  10:20–10:40 Ferhan Atici: A New Approach for Modeling with Discrete Fractional Equations
  10:40–11:00 Philippe Laval: Lotka-Volterra/Gompertz competition model for tumor growth

09:40–11:00 **SESSION 8**, MLC 268: Inverse Problems and Imaging - 1 - Part I/III
  Chair: Peijun Li and Haomin Zhou
  09:40–10:00 Amin Boumenir: Identification of a wave equation generated by a string
  10:00–10:20 Nguyen Hoang: An inverse problem for a multidimensional fractional diffusion equation
  10:20–10:40 Jiguang Sun: An efficient finite element method for grating profile reconstruction
  10:40–11:00 Christina Frederick: Multiscale computation and sampling theory

09:40–11:00 **SESSION 3**, MLC 275: Computational Challenges and Progress in Dynamical Systems- Part I/III
  Chair: Israel Ncube
  09:40–10:00 Israel Ncube: Stability analysis in a multiple-delayed system of differential equations
  10:00–10:20 Susmita Sadhu: Canard explosion and bistability in a deterministic two-trophic ecological model and effect of noise on the system
  10:40–11:00 William Frazier: Application of Symplectic Integration on a Dynamical System

11:00–12:00 **KEYNOTE LECTURE**: keynote_II, MLC 101
  Yunmei Chen: Fast Accelerated Bundle Level Methods for Large Scale Convex Optimization and Applications
  Chair: Ming-Jun Lai

12:00 – 01:30 Lunch (on your own)
01:30 – 02:30 **SESSION 13**, MLC 101: Inverse Problems and Imaging - II- Part II/II
Chair: Shitao Liu and Yuyuan Ouyang

1:30 – 01:50 Rachel Grotheer: More with Less: Sparsity in the Hyperspectral Diffuse Optical Tomography Inverse Problem
01:50 – 02:10 Jeong-Roch Yoon: Elastography: Use of interior wave for tumor identification
02:10 – 02:30 Brandan Ames: Pytchographic phase retrieval by convex relaxation

01:30 – 02:30 **SESSION 1**, MLC 147: Recent Advances in Numerical Methods for Fluid Flow with Applications - Part II/V
Chair: Leo Rebholz and Zhu Wang

01:50 – 2:10 Xinfeng Liu: Integration factor method for a class of differential equations
02:10 – 02:30 Adrien Lefieux: A locally anisotropic fluid-structure interaction remeshing strategy for thin solids with application to a hinged rigid leaflet

01:30 – 02:30 **SESSION 2**, MLC 153: Fast Algorithm in PDE and Their Applications - Part II/II
Chair: Zhan Chen and Duan Chen

1:30 – 01:50 Yi Sun: Numerical Simulations of Multicellular Aggregate Self-assembly in Biofabrication
01:50 – 02:10 Qingshan Chen: The multi-level Monte Carlo method for computing quantities of interest -- a practical guide
02:10 – 02:30 Zhan Chen: ADI approaches for 3D parabolic PDE and its applications

01:30 – 02:30 **SESSION 4**, MLC 207: Fluids: modeling, analysis and simulation - Part II/IV
Chair: Xiaoming Wang, Nick Moore, Mark Sussman

01:30 – 01:50 Hyesuk Lee: Decoupling algorithms for a fluid-poroelastic system
01:50 – 2:10 Gregoroy Herschlag: Optimal reservoir conditions for material extraction across pumping and porous channels
02:10 – 02:30 Bryan Quaife: An integral equation method for Stokes flow in porous media

01:30 – 02:30 **SESSION 6**, MLC 245: PDEs for Fluid Mechanics with Applications in Medical Biology - Part II/III
Chair: Bikash Das, Thinh Kieu, Ryan Thompson

1:30 – 01:50 Lake Ritter: A Mathematical Model of Atherogenesis
01:50 – 2:10 Kofii Fadimba: A Mathematical Analysis for a Formulation of Porous Medium Equation: A Priori Estimates and Regularization
02:10 – 02:30 Yuan-Nan Young: On the gating of mechanosensitive channels by fluid shear stress

01:30 – 02:30 **SESSION 7**, MLC 267: Mathematics in the medical field: theory, applications and numerical simulations - Part II/II
Chair: Ana-Maria Croicu, Philippe Laval

01:30 – 01:50 Cameron Browne: Immune Response in Virus Model Structured by Cell Infection-Age
01:50 – 02:10 Nick Cogan: Mathematical Aspects of Bacterial Tolerance
02:10 – 02:30 Ana-Maria Croicu: Effect of Reproduction Number on Optimal Control of a Mathematical Model for HIV Infection of CD4+ T Cells

01:30 – 02:30 **SESSION 8**, MLC 268: Inverse Problems and Imaging - I- Part II/III
Chair: Peijun Li and Haomin Zhou

1:30 – 01:50 Kai Huang: A Direct Imaging Method Using the Generalized Foldy-Lax Formulation
01:50 – 02:10 Xiaojing Ye: On convergence of decentralized consensus algorithm with delayed stochastic gradients
01:30 – 02:30 **SESSION 3**, MLC 275: Computational Challenges and Progress in Dynamical Systems - Part II/II
  Chair: Israel Ncube
  01:30 – 01:50 Yinshu Wu: A problem on global stability of a ratio-dependent predator-prey model
  01:50 – 02:10 Vani Cheruvu: Wavelet based solutions for Laplace equation in an arbitrary shaped domain
  02:10 – 02:30

02:30 – 03:00 **COFFEE BREAK**

03:00 – 04:00 **KEYNOTE LECTURE**: keynote - III, MLC 101
  Eberhard Voit: Wanted: The Best Models for Systems Biology
  Chair: Ohannes Karakashian

04:00 – 05:00 **SESSION 1**, MLC 101: Computational Methods in Inverse Problems and Imaging - Part I/II
  Chair: Yumei Chen and Xiaojing Ye
  04:00 – 04:20 Haomin Zhou: Adaptive Local Iterative Filtering (ALIF) for Signal Decompositions and Applications
  04:20 – 04:40 Wei Zhu: Augmented Lagrangian method for an Euler's elastica based segmentation model that promotes convex contours
  04:40 – 05:00 Yifei Lou: The Difference of L1 and L2 for Compressive Sensing and Image Processing

04:00 – 05:00 **SESSION 4**, MLC 207: Fluids: modeling, analysis and simulation - Part III/IV
  Chair: Xiaoming Wang, Nick Moore, Mark Sussman
  04:00 – 04:20 Mingwen Fei: Dynamics of the nematic-isotropic sharp interface for the liquid crystal
  04:20 – 04:40 Nick Moore: How bodies erode and dissolve in fluid flows
  04:40 – 05:00 Richard McLaughlin: Geometric control of asymmetries in passive scalars advected in rectangular and elliptical pipes

04:00 – 05:00 **SESSION 6**, MLC 245: PDEs for Fluid Mechanics with Applications in Medical Biology - Part III/III
  Chair: Bikash Das, Thinh Kieu, Ryan Thompson
  04:00 – 04:20 Sara Abdelsalam: Influence of Pulsatile Flow on the Peristaltic Transport of a Particle-Fluid Suspension in a Narrow Artery: Blood Flow Model
14:20 – 04:40 Luan Hoang: Asymptotic expansion in Gevrey spaces for solutions of Navier-Stokes equations

04:00 – 05:00 SESSION 5, MLC 267: Parallel and distributed computing for biomedical imaging- Part I/I
   Chair: Shannon Quinn and Taiming Liu
04:00 – 04:20 Lina M. Alvarez: Using GPU parallel computing in breast cancer diagnostic imaging
04:20 – 04:40 P. Lanka: Perils of Using Cross-validation for Performance Estimation in Neuroimaging-based Diagnostic Classification
04:40 – 05:00 Xiang Li: Scalable Fast Rank-1 Dictionary Learning for fMRI Gig Data Analysis

04:00 – 05:00 SESSION 8, MLC 268: Inverse Problems and Imaging - I - Part III/III
   Chair: Peijun Li and Haomin Zhou
14:00 – 04:20 Shixu Meng: The Interior Transmission Eigenvalue Problem for Maxwell's Equations in Inverse Scattering
04:20 – 04:40 Peter Muller: Towards clinical use of electrical impedance tomography
04:40 – 05:00 Yuanchang Sun: Computational Modeling of Data Fitting with Nonlinear Distortions

04:00 – 05:00 SESSION 11, MLC 275: Data assimilation, nonlinear filtering, and machine learning
   - Part I/II
   Chair: Kody J. H. Law, Feng Bao, and Vasileios Maroulas
14:00 – 04:20 George Michailidis: High-dimensional Vector Autoregressive Processes: Modeling, Estimation and Applications
04:20 – 04:40 Alexandro Barone: Cardiac conductivity estimation by a variational approach
04:40 – 05:00 John Maclean: A coherent structure approach for parameter estimation in Lagrangian Data Assimilation

SUNDAY, MARCH 13, 2016

09:00 – 10:00 SESSION 10, MLC 101: Spline and Weak Galerkin Methods for Numerical Solution of PD E- Part I/II
   Chair: Ming-Jun Lai
09:00 – 09:20 Ming-Jun Lai: The bivariate spline method for numerical solution of 2nd Elliptic PDE in Non-divergence Form
09:20 – 09:40 George Slavov: Bivariate Spline Solution of Time Dependent Nonlinear PDE for Population Density over Irregular Domains
09:40 – 10:00 Jay Lanterman: A Polygonal Spline Method for General 2nd-Order Elliptic Equations and its Applications

09:00 – 10:00 SESSION 1, MLC 147: Recent Advances in Numerical Methods for Fluid Flow with Applications - Part IV/V
   Chair: Leo Rebholz and Zhu Wang
09:00 – 09:20 Xuping Xie: Large Eddy Simulation Reduced Order Models
09:20 – 09:40 Alex Veneziani: Computational Hemodynamics from the Proof of Concept to the Bedside: How not to get "lost in translation"?
09:40 – 10:00 Nan Jiang: A fast algorithm to compute flow ensembles
09:00 – 10:00 SESSION 12, MLC 153: Methods for and Applications in Transport Problems – Part II/III
Chair: Rick Barnard
09:00 – 09:20 Zheng Chen: Maximum-Principle-Satisfying third order Direct discontinuous Galerkin methods for time dependent convection diffusion equations on unstructured triangular mesh
09:20 – 09:40 Weixiong Zheng: Accurate and Robust Nonlinear Filtering Moment Closure for Radiation Transport
09:40 – 10:00 Paul Laiu: Positive filtered P_N method for linear transport equations

09:00 – 10:00 PAPERS, MLC 207
Chair: Elisabeth Brown
09:00 – 09:20 Tania Hazra and Shan Zhao: Stable Operator Splitting Method for Free Energy Calculations of One Atom Model
09:20 – 09:40 Elisabeth Brown and Michael Shearer: A Nonlinear PDE Modeling Carbon Sequestration
09:40 – 10:00 Xin Luo and Min Sun: An Improved Modal Interval Algorithm for Unconstrained Continuous Minimax Problems

09:00 – 10:00 SESSION 14, MLC 245: Optimization, optimal control, and numerical simulations with applications- Part I/II
Chair: Seong Jun Kim
09:00 – 09:20 Manuela Manetta: Newton's flow in stochastic dynamics towards global minimizers
09:20 – 09:40 Liang Zhao: Fast Decentralized Gradient Descent Method and Applications to In-situ Seismic Tomography
09:40 – 10:00 Wuchen Li: A new approach to optimal control with constraints

09:00 – 10:00 SESSION 15, MLC 267: The Mathematics of Omics- Part I/II
Chair: Juan B. Gutierrez
09:00 – 09:20 Caner Kazanci: Reverse engineering of biochemical reaction systems
09:20 – 09:40 Yi Yan: Multi-omic integration via orthogonalization of time series
09:40 – 10:00 Jinho Choi: Dynamic Feature Induction: The Last Gist to the State-of-the-Art

09:00 – 10:00 SESSION 16, MLC 268: Computational methods in inverse problems and imaging Part I/II
Chair: Xiaojing Ye and Yunmei Chen
09:00 – 09:20 Wei Zhang: Fast bundle level method with gradient sliding for composite optimization
09:20 – 09:40 Yuyuan Ouyang: Gradient sliding for saddle point problems
09:40 – 10:00 Ben Sirb: Decentralized Delayed Gradient Descent

09:00 – 10:00 SESSION 11, MLC 275: Data assimilation, nonlinear filtering, and machine learning Part I/II
Chair: Kody J. H. Law, Feng Bao, and Vasileios Maroulas
09:00 – 09:20 Dong Xia: Optimal Estimation of Low Rank Density Matrix
09:20 – 09:40 Andrew Marchese: Machine Learning: A Stochastic Point of View
09:40 – 10:00 Xiaoyang Pan: Consistency and Asymptotics of Least- Squares Estimator for Partially Observed Jump-Diffusion Processes

10:00 – 10:30 COFFEE BREAK

10:30 – 12:30 SESSION 10, MLC 101: Spline and Weak Galerkin Methods for Numerical Solution of PDE - Part II/II
Chair: Ming-Jun Lai
10:50 – 11:10 Xie Ye: The Weak Galerkin Methods
11:30 – 11:50 Hyunju Kim: Partition of unity isogeometric analysis of boundary layer problems
11:50 – 12:10 Brandon Reid and Roger Sidje: Computationally Efficient Approximations for the Equilibrium State of the Chemical Master Equation

10:30 – 12:30 SESSION 1, MLC 147: Recent Advances in Numerical Methods for Fluid Flow with Applications - Part V/V
Chair: Leo Rebholz and Zhu Wang
10:30 – 10:50 Leo Rebholz: Yosida splitting methods for Navier-Stokes: analysis and some improvements
10:50 – 11:10 Steven Wise: Stability and Convergence for some Numerical Approximations of Cahn-Hilliard-Navier-Stokes Systems
11:10 – 11:30 An-Bao Xu and Frank Uhlig: Optimal Solutions for Solvable and Unsolvable Inhomogeneous Linear Matrix Equations of Generalized Sylvester Type
11:30 – 11:50 Jonas Holderman: On the Physics of Incompressible Fluids
11:50 – 12:10 Wenqiang Feng: Multigrid Preconditioned Steepest Descent Solvers for Aviles-Giga type Energy: Application to Thin Film Epitaxy

10:30 – 12:30 SESSION 12, MLC 153: Methods for and Applications in Transport Problems. - Part III/III
Chair: Rick Barnard
10:50 – 11:10 Richard Barnard: Sensitivity of radiative dose computations with respect to material parameters
11:10 – 11:30 Christina Lee and Gregor Kovacic: Wave patterns in an excitable neuronal network
11:30 – 11:50 Tesfaye Asfaw, Konstantin Kapustin and Vladimir Bondarenko: Biexponential Inactivation and Recovery of the Human Cardiac Sodium Channel
11:50 – 12:10 Tulsu Upadhyay and Jiu Ding: Homogeneous Piecewise Linear Maximum Entropy Method for Approximating Invariant Densities
12:10 – 12:30 Keisha Cook: Revised Tau-Leaping Stochastic Simulation Algorithm

10:30 – 12:30 SESSION 4, MLC 207: Fluids: modeling, analysis and simulation - Part IV/IV
Chair: Xiaoming Wang, Nick Moore, Mark Sussman
10:30 – 10:50 Yingjie Liu: Central scheme on overlapping cells with a well-balanced reformulation for solving the shallow water equation
11:10 – 11:30 Sofia Guzzetti: Hierarchical Model Reduction for Incompressible Flows in Cylindrical Domains
11:30 – 11:50 Huijuan Xu and Alessandro Veneziani: Large Eddy Simulation of Hemodynamics in Patients with Acute Type B Aortic Dissection
11:50 – 12:10 Paula D Mullins, J Jeremy Rice and Vladimir E Bondarenko: Modeling beta1-adrenergic regulation of mouse ventricular myocyte contraction
12:10 – 12:30 Abbiana Arenas, Neil Thackar, Samita Andreansky and Evan Haskell: Parsimony in modeling of immune response to IAV infection

10:30 – 12:30 SESSION 14, MLC 245: Optimization, optimal control, and numerical simulations with applications- Part II/II
Chair: Seong Jun Kim
10:30 – 10:50 Seong Jun Kim: Position optimization for sensors with a failure rate
10:50 – 11:10 Maryam Yashtini: A fast relaxed normal two split methods and an effective weighted total variation approach for Euler's elastica inpainting
11:10 – 11:30 Melissa Strait and Michael Shearer: Higher-Order PDE Describing Two-Phase Flow in a Hele-Shaw Cell
11:30 – 11:50 Khanh Dinh and Roger Sidje: Solving the chemical master equation with time-varying parameters
11:50 – 12:10 Summer Atkins, Brendan Ames, Line Clemmensen and Gudmundur Einarsson: Fast classification
of Big Data: proximal methods for sparse discriminant analysis
12:10 – 12:30 Tiffany Jones and Qin Sheng: A Decomposed Compact Method for Highly Oscillatory Wave Problem
10:30 – 12:30 SESSION 15 + PAPERS, MLC 267: The Mathematics of Omics - Part II/II
   Chair: Juan B. Gutierrez
10:30 – 10:50 Shuzhao Li: Kinetic networks in vaccine induced immune response in humans
10:50 – 11:10 Gregory Goeckel: Three Numeric Series Schemes for Function Approximation
11:10 – 11:30 Wei Cui and Zhijian Wu: Optimal Hedging Strategy under Fractional Brownian Motion Market Model
11:30 – 11:50 Mahmoud Darassi and Layachi Hadji: The Effects of Sedimentation and Thermophoresis on the Onset of the Convection in Colloidal Suspensions
11:50 – 12:10 Ghanshyam Bhatt: Deterministic sampling matrices for compressed sensing

10:30 – 12:30 PAPERS, MLC 268
   Chair: Alessandro Veneziani
10:30 – 10:50 Boyi Yang, Gaetano Esposito, Marina Piccinelli, Tianli Han, Yilin Lin, Lars Ruthotto and Alessandro Veneziani: Patient-Specific CFD Analysis of Hemodynamics in Coronaries Treated with Biodegradable Stents
10:50 – 11:10 Emine Celik, Luan Hoang and Thinh Kieu: On a general class of Forchheimer gas flows in porous media
11:10 – 11:30 Chad Sockwell: Simulations of Vortex Pinning In Superconductors
11:30 – 11:50 Yu-Jiang Wu, Ai-Li Yang and Xu Li: Efficient preconditioned splitting iteration method for solving a class of saddle-point problems
11:50 – 12:10 James Moseley: THE DISCRETE AGGLOMERATION MODEL: THE FIXED PROBLEM WITH APPLICATION TO THE QUADRATIC KERNEL

10:30 – 12:30 PAPERS, MLC 275:
   Chair: Vladimir Bondarenko
10:30 – 10:50 Kelvin Rozier and Vladimir Bondarenko: A Mathematical model of combined Beta 1 and Beta 2 Adrenergic Signaling system in Mouse Ventricular Myocytes
10:50 – 11:10 Zhihan Wei: Three-dimensional matched alternating direction implicit (ADI) schemes for solving the heat equation with complex interface
11:10 – 11:30 David Prager: A Continuous Model for Delayed Insulin Activation in Patients with Type 1 Diabetes
11:30 – 11:50 Muhammad Hameed: Influence of temperature-dependent viscosity on the peristaltic transport of a viscous fluid
11:50 – 12:10 Y Liu, Suo Yang and Alexander Kurganov: Central scheme on overlapping cells and a well balanced reformulation for solving the shallow water equation
12:10 – 12:30 Vladimir Bondarenko: A Computer model of the Beta 1 Adrenergic Signaling system in Mouse Ventricular Myocytes

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THE END OF THE PROGRAM
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