

4th Annual Meeting of the SIAM Texas-Louisiana Section

HOSTED BY: SIAM TEXAS-LOUISIANA SECTION AND
THE UNIVERSITY OF TEXAS-RIO GRANDE VALLEY
NOVEMBER 5-7, 2021, SOUTH PADRE ISLAND, TEXAS

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4TH ANNUAL MEETING OF THE SIAM TEXAS-LOUISIANA SECTION

Program for Friday, November 5, 2021

- LOCATION GRAND BALLROOM
- 13:00–17:00 Registration
- LOCATION GRAND BALLROOM
- 14:00–14:45 Preliminary Poster Session and Refreshments
- LOCATION PELICAN
- 14:45–15:45 Panel Discussion: Career panel
▷ Cristina Villalobos, Associate Dean, College of Science, University of Texas Rio Grande Valley
▷ Victoria Huynh, Senior Director in the Science and Research department at PROS (NYSE: PRO)
▷ Michael Chertkov, Chair, Program in Applied Mathematics, The University of Arizona
- 15:45–16:00 *Coffee break*
- LOCATION PELICAN
- 16:00–17:00 **Plenary Speaker: Rachel Ward** (rward@math.utexas.edu)
University of Texas at Austin
“Data-driven forecasting in complex systems: a tale of two approaches using kernels and random projections”
- LOCATION Miscellaneous rooms
- 17:00–19:00 Minisymposium Parallel Sessions 1
▷ Advances in theory and applications of composite materials. Part 1
▷ Algorithmic Algebra and Geometry. Part 1
▷ Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 1
▷ Mathematics and Computation in Biomedicine. Part 1
▷ Finite element and related methods for challenging problems. Part 1
▷ Computational Methods in Wave Theory. Part 1

Program for Saturday, November 6, 2021

- LOCATION Miscellaneous rooms
- 08:00–10:00 Minisymposium Parallel Sessions 2
▷ Advances in theory and applications of composite materials. Part 2
▷ Algorithmic Algebra and Geometry. Part 2
▷ Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 2
▷ Mathematics and Computation in Biomedicine. Part 2
▷ Recent advances in Image processing and Data Sciences.
▷ Finite element and related methods for challenging problems. Part 2
▷ Computational Methods in Wave Theory. Part 2

- ▷ Mathematical foundation of deep learning with the applications to PDE. Part 1
- 10:00–10:15 *Coffee break*
- LOCATION PELICAN
- 10:15–11:15 **Public Plenary Speaker: Lisa Fauci** (fauci@tulane.edu)
Tulane University
“Buckling, mixing, swimming, dissolving: adventures with helices at the microscale.”
- 11:15–13:00 Lunch
- LOCATION Miscellaneous rooms
- 13:00–15:00 Minisymposium Parallel Sessions 3
 - ▷ Advances in theory and applications of composite materials. Part 3
 - ▷ Algorithmic Algebra and Geometry. Part 3
 - ▷ Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 3
 - ▷ Mathematics and Computation in Biomedicine. Part 3
 - ▷ Geometry of Machine Learning
 - ▷ Optimal measures and point configurations. Part 1
 - ▷ Reproducibility, reliability, and robustness: confronting models from across mathematical biology with data. Part 1
 - ▷ Mathematical foundation of deep learning with the applications to PDE. Part 2
 - ▷ Recent Advances in Model Order Reduction and Applications in Inverse Problems
- 15:00–15:15 *Coffee break*
- 15:15–16:15 **Plenary Speaker: Alejandro Aceves** (aceves@smu.edu)
Southern Methodist University
“Modeling climate change: A dynamical systems approach”
- 16:15–16:30 *Coffee break*
- LOCATION Miscellaneous rooms
- 16:30–18:30 Minisymposium Parallel Sessions 4
 - ▷ Advances in theory and applications of composite materials. Part 4
 - ▷ Algorithmic Algebra and Geometry. Part 4
 - ▷ Mathematics and Computation in Biomedicine. Part 4
 - ▷ High-order structure preserving techniques for simulating transport phenomena and fluids. Part 1
 - ▷ Dispersive Wave Equations with Applications in Optics and Fluids. Part 1
 - ▷ Optimal measures and point configurations. Part 2
 - ▷ Reproducibility, reliability, and robustness: confronting models from across mathematical biology with data. Part 2
 - ▷ Algebraic and Geometric Aspects of Integrable Systems. Part 1
 - ▷ Spectral theory of discrete and continuous models in quantum mechanics. Part 1
 - ▷ Complex adaptive systems in Life and Social Sciences. Part 1
- LOCATION GRAND BALLROOM
- 18:30–21:30 Dinner and Poster Session
 - ▷ Remarks by Dr. Lisa Fauci, SIAM President 2019-2020

Program for Sunday, November 7, 2021

LOCATION Miscellaneous rooms

08:00–10:00 Minisymposium Parallel Sessions 5

- ▷ Redistricting: Mathematical and Political Perspectives
- ▷ Dispersive Wave Equations with Applications in Optics and Fluids. Part 2
- ▷ Algebraic and Geometric Aspects of Integrable Systems. Part 2
- ▷ Numerical methods for problems with interfaces and surface PDEs. Part 1
- ▷ Numerical methods for multi-phase flows in porous media
- ▷ High-order structure preserving techniques for simulating transport phenomena and fluids. Part 2
- ▷ Applications of Algebra in Mathematical Physics and Integrable Systems. Part 1
- ▷ Recent developments in finite element methods. Part 1
- ▷ Spectral theory of discrete and continuous models in quantum mechanics. Part 2
- ▷ Complex adaptive systems in Life and Social Sciences. Part 2

10:00–10:15 *Coffee break*

10:15–12:15 Minisymposium Parallel Sessions 6

- ▷ Algebraic and Geometric Aspects of Integrable Systems. Part 3
- ▷ Advances in Krylov subspaces, preconditioning and analysis.
- ▷ Numerical methods for problems with interfaces and surface PDEs. Part 2
- ▷ Spectral theory of discrete and continuous models in quantum mechanics. Part 3
- ▷ High-order structure preserving techniques for simulating transport phenomena and fluids. Part 3
- ▷ Efficacy and safety statistics of COVID-19 treatment and prophylaxis protocols
- ▷ Applications of Algebra in Mathematical Physics and Integrable Systems. Part 2
- ▷ Recent developments in finite element methods. Part 2
- ▷ Complex adaptive systems in Life and Social Sciences. Part 3

Friday – Minisymposium Parallel Sessions 1

Advances in theory and applications of composite materials. Part 1

- LOCATION FALCON
- ORGANIZED BY *Aaron Welters* (awelters@fit.edu), *Florida Institute of Technology*
- ORGANIZED BY *Anthony Stefan* (astefan2015@my.fit.edu), *Florida Institute of Technology*
- ORGANIZED BY *Robert Viator* (rviator1@swarthmore.edu), *Swarthmore*
- CHAired BY *Robert Viator*
- 17:00–17:30 **Aaron Welters** (awelters@fit.edu)
Florida Institute of Technology
“Symmetric determinantal representations of multivariable polynomials and their application in the theory of composites”
Joint work with Anthony Stefan (Florida Institute of Technology)
- 17:30–18:00 **Thuyen Dang** (ttdang9@central.uh.edu)
University of Houston
“A simplified model for magnetorheological fluid and its corresponding effective system”
Joint work with Yuliya Gorb (National Science Foundation) and Silvia Jimenez Bolanos (Colgate University)
- 18:00–18:30 **Ornella Mattei** (mattei@sfsu.edu)
San Francisco State University
“Bounds on the response of lossy two-phase composites subject to time-varying fields”
- 18:30–19:00 **Owen Miller** (owen.miller@yale.edu)
Yale University
“Photonic and Quantum Design Problems as QCQPs”

Algorithmic Algebra and Geometry. Part 1

- LOCATION OSPREY
- ORGANIZED BY *Alperen Ergur* (alperen.ergur@utsa.edu), *The University of Texas San Antonio*
- ORGANIZED BY *J. Maurice Rojas* (jmauricerojas@gmail.com), *Texas A&M University*
- ORGANIZED BY *Frank Sottile* (sottile@tamu.edu), *Texas A&M University*
- CHAired BY *Frank Sottile*
- 17:00–17:30 **Joe Kileel** (jkileel@math.utexas.edu)
University of Texas at Austin
“Recovering group orbits from polynomial invariants, and applications to cryo-EM”

- 17:30–18:00 **Arpan Pal** (arpan@tamu.edu)
Texas A&M University
 “Tensors of Minimal Border Rank”
 Joint work with JM Landsberg and Joachim Jelisiejew
- 18:00–18:30 **Runshi Geng** (gengrunshi@tamu.edu)
Texas A&M University
 “On Geometry of Geometric Rank”
 Joint work with J.M. Landsberg
- 18:30–19:00 **Hang Huang** (huanghang1109@gmail.com)
Texas A&M University
 “Border Apolarity and Border Rank of 3×3 Permanent”

Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 1

- LOCATION CARACARA
- ORGANIZED BY **Bruce Wade** (bruce.wade@louisiana.edu), *University of Louisiana at Lafayette*
- CHAired BY **Bruce Wade**
- 17:00–17:30 **Zhaosheng Feng** (zhaosheng.feng@utrgv.edu)
University of Texas Rio Grande Valley
 “Implicit-explicit wave solutions of a class of nonlinear evolution equations”
- 17:30–18:00 **Qin Sheng** (qin_sheng@baylor.edu)
Baylor University
 “A Second-Order Semi-Discretized Scheme for Solving Stochastic Quenching Models on Arbitrary Spatial Grids”
- 18:00–18:30 **Olaniyi Iyiola** (oiyiola@clarkson.edu)
Clarkson University
 “Dynamical systems and iterative schemes with inertial and adaptive step size”
- 18:30–19:00 **E. Macias-Diaz** (jemacias@correo.uaa.mx)
Autonomous University of Aguascalientes
 “Numerical solution of a space-fractional Fermi-Pasta-Ulam-Tsingou regime”

Mathematics and Computation in Biomedicine. Part 1

- LOCATION SANDPIPER
- ORGANIZED BY **Sebastian Acosta** (sebastian.acosta@bcm.edu), *Baylor College of Medicine, Houston TX*
- CHAired BY **Sebastian Acosta**
- 17:00–17:30 **Charles Puelz** (charles.puelz@bcm.edu)
Baylor College of Medicine and Texas Children’s Hospital
 “Immersed boundary methods for pediatric and adult cardiovascular models”

- 17:30–18:00 **Bryant Wyatt** (wyatt@tarleton.edu)
Tarleton State University
 “Supraventricular Tachycardia Study Using a Dynamic Computer Generated Atria”
- 18:00–18:30 **Beatrice Riviere** (riviere@rice.edu)
Rice University
 “Numerical simulations of reduced solute transport”
- 18:30–19:00 **Mario Bencomo** (mjb6@rice.edu)
Rice University
 “Discrete adjoint computations for relaxation Runge-Kutta methods”

Finite element and related methods for challenging problems. Part 1

- LOCATION **IBIS**
- ORGANIZED BY **Todd Arbogast** (arbogast@oden.utexas.edu), *University of Texas at Austin*
- ORGANIZED BY **Robert Kirby** (robert_kirby@baylor.edu), *Baylor University*
- CHAired BY **Todd Arbogast**
- 17:00–17:30 **Robert Kirby** (robert_kirby@baylor.edu)
Baylor University
 “Domain truncation BC for scattering”
- 17:30–18:00 **Chuning Wang** (cwangaw@utexas.edu)
University of Texas at Austin
 “Direct Serendipity and Mixed Finite Elements on Convex Polygons”
- 18:00–18:30 **Jorge Marchena-Menendez** (jorge_marchena1@baylor.edu)
Baylor University
 “Schwarz methods for serendipity elements”
- 18:30–19:00 **Alan Demlow** (demlow@math.tamu.edu)
Texas A&M University
 “Maximum norm a posteriori estimates for convection-diffusion problems”

Computational Methods in Wave Theory. Part 1

- LOCATION **EGRET**
- ORGANIZED BY **Thomas Hagstrom** (thagstrom@smu.edu), *Southern Methodist University*
- CHAired BY **Thomas Hagstrom**
- 17:00–17:30 **Jesse Chan** (jesse.chan@rice.edu)
Rice University
 “On the entropy projection and the robustness of high order entropy stable discontinuous Galerkin schemes for under-resolved flows”
- 17:30–18:00 **Stephen Lau** (lau@math.unm.edu)

University of New Mexico

“Gauge-preserving boundary conditions for the helically reduced Einstein equations”

18:00–18:30

Judith Munoz-Matute (judith.munozmatute@gmail.com)

University of Texas at Austin

“Time-marching DPG scheme and error representation for transient problems.”

18:30–19:00

Sue Minkoff (sminkoff@utdallas.edu)

University of Texas at Dallas

“How extended source inversion can aid solution of seismic inverse problems”

Saturday – Minisymposium Parallel Sessions 2

Advances in theory and applications of composite materials. Part 2

LOCATION FALCON

ORGANIZED BY *Aaron Welters* (awelters@fit.edu), *Florida Institute of Technology*

ORGANIZED BY *Anthony Stefan* (astefan2015@my.fit.edu), *Florida Institute of Technology*

ORGANIZED BY *Robert Viator* (rviator1@swarthmore.edu), *Swarthmore*

CHAired BY *Aaron Welters*

08:00–08:30 **Robert Viator Jr.** (rviator1@swarthmore.edu)
Swarthmore College
“Bloch Waves in 3-dimensional high-contrast photonic crystals”

08:30–09:00 **Ruchira Perera** (jperer3@lsu.edu)
Louisiana State University
“Bloch Spectra for High Contrast Elastic Media”

09:00–09:30 **David Morison** (nosiromdivad@gmail.com)
University of Utah
“Order to Disorder in Quasiperiodic Composites”

09:30–10:00 **Matthias Maier** (maier@math.tamu.edu)
Texas A&M University
“Optical Phenomena, Resonances, and Homogenization of Layered Heterostructures”

Algorithmic Algebra and Geometry. Part 2

LOCATION OSPREY

ORGANIZED BY *Alperen Ergur* (alperen.ergur@utsa.edu), *The University of Texas San Antonio*

ORGANIZED BY *J. Maurice Rojas* (jmauricerojas@gmail.com), *Texas A&M University*

ORGANIZED BY *Frank Sottile* (sottile@tamu.edu), *Texas A&M University*

CHAired BY *Frank Sottile*

08:00–08:30 **Brandilyn Stigler** (bstigler@smu.edu)
Southern Methodist University
“Geometric Criteria on Model Spaces of Biological Networks”

08:30–09:00 **Elise Walker** (elise.walker@tamu.edu)
Texas A&M University
“Homotopies are useful numerical methods for solving systems of polynomial equations.”

- 09:00–09:30 **Thomas Yahl** (thomasjahl@tamu.edu)
Texas A&M University
 “Parameter Homotopies in Cox Coordinates”
- 09:30–10:00 **Kalina Mincheva** (kmincheva@tulane.edu)
Tulane University
 “Hilbert Schemes for non-pinhole cameras”

Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 2

- LOCATION CARACARA
- ORGANIZED BY **Bruce Wade** (bruce.wade@louisiana.edu), *University of Louisiana at Lafayette*
- CHAired BY **Qin Sheng**
- 08:00–08:30 **Brian Moore** (brian.moore@ucf.edu)
University of Central Florida
 “Exponential discrete gradient schemes for linearly damped-driven Poisson systems”
- 08:30–09:00 **Joshua Lee Padgett** (padgett@uark.edu)
University of Arkansas
 “Structure-preserving nonlinear operator splitting methods for singular partial differential equations”
- 09:00–09:30 **Bruce Wade** (bruce.wade@louisiana.edu)
University of Louisiana at Lafayette
 “Dimensional Splitting with Exponential Time Differencing Schemes for Advection-Diffusion-Reaction Systems”
- 09:30–10:00 **Emmanuel Asante-Asamani** (easantea@clarkson.edu)
Clarkson University
 “Exponential time differencing with real distinct poles for simulating chemotaxis problems.”

Mathematics and Computation in Biomedicine. Part 2

- LOCATION SANDPIPER
- ORGANIZED BY **Sebastian Acosta** (sebastian.acosta@bcm.edu), *Baylor College of Medicine, Houston TX*
- CHAired BY **Charles Puelz**
- 08:00–08:30 **Rahnuma Islam** (rahnuma.islam@ttu.edu)
Texas Tech University
 “Chemotactic system exhibiting traveling band phenomena based on Einstein Paradigm for Brownian motion”
- 08:30–09:00 **Tahsin Khajah** (tkhajah@uttyler.edu)
University of Texas at Tyler

“Phase-reduced isogeometric on surface radiation conditions for high-frequency scattering analyses at dramatically low computational cost”

09:00–09:30 **Jesse Chan** (jesse.chan@rice.edu)
Rice University
“Efficient high order DG methods on moving curved meshes”

09:30–10:00 **Greg Morrison** (gcmorrison@uh.edu)
University of Houston Dept of Physics
“Modeling stiff biomolecules under spatial constraints”

Recent advances in Image processing and Data Sciences

LOCATION SPOONBILL

ORGANIZED BY **Mujibur Rahman Chowdhury** (mujib@smu.edu), *Southern Methodist University*

CHAired BY **Mujibur Rahman Chowdhury**

08:00–08:30 **Yifei Lou** (yifei.lou@utdallas.edu)
University of Texas Dallas
“Graph Regularized Models for Blind Hyperspectral Unmixing”

08:30–09:00 **Asim Kumer Dey** (adey@utep.edu)
University of Texas at El Paso
“Topological anomaly detection in a temporal transportation network”

09:00–09:30 **Yifeng Gao** (yifeng.gao@utrgv.edu)
University of Texas Rio Grande Valley
“Efficient Frequent Pattern Mining in Large-Scale Time Series ”

09:30–10:00 **Sachith Eranga Dassanayaka** (sachith-eranga.dassanayaka@ttu.edu)
Texas Tech University
“Classifying the Actors of the Information Operation Networks through a Machine Learning Technique”

Finite element and related methods for challenging problems. Part 2

LOCATION IBIS

ORGANIZED BY **Todd Arbogast** (arbogast@oden.utexas.edu), *University of Texas at Austin*

ORGANIZED BY **Robert Kirby** (robert.kirby@baylor.edu), *Baylor University*

CHAired BY **Robert Kirby**

08:00–08:30 **Jiaqi Li** (jiaqi@oden.utexas.edu)
University of Texas at Austin
“DPG in Banach Spaces”

08:30–09:00 **Judit Munoz-Matute** (judith.munozmatute@gmail.com)
University of Texas at Austin

- “Time-marching DPG scheme for linear hyperbolic problems”
- 09:00–09:30 **Jeonghun Lee** (jeonghun_lee@baylor.edu)
Baylor University
 “Robust numerical methods for fluid and poroelastic structure interaction problems”
- 09:30–10:00 **Todd Arbogast** (arbogast@oden.utexas.edu)
University of Texas at Austin
 “Self-Adaptive Theta Schemes for hyperbolic equations”

Computational Methods in Wave Theory. Part 2

- LOCATION EGRET
- ORGANIZED BY **Thomas Hagstrom** (thagstrom@smu.edu), *Southern Methodist University*
- CHAired BY **Thomas Hagstrom**
- 08:00–08:30 **Lu Zhang** (lz2784@columbia.edu)
Columbia University
 “Coupling Deep Learning with Full Waveform Inversion”
- 08:30–09:00 **Wei Guo** (weimath.guo@ttu.edu)
Texas Tech University
 “High order low-rank tensor methods for the Vlasov simulations”
- 09:00–09:30 **Juntao Huang** (huangj75@msu.edu)
Michigan State University
 “Structure-preserving machine learning moment closures for the radiative transfer equation: enforcing hyperbolicity and physical characteristic speeds”
- 09:30–10:00 **Alexander Mamonov** (mamonov@math.uh.edu)
University of Houston
 “Acoustic velocity estimation with reduced order models”

Mathematical foundation of deep learning with the applications to PDE. Part 1

- LOCATION HERON
- ORGANIZED BY **Lizuo Liu** (lizuol@smu.edu), *Southern Methodist University*
- ORGANIZED BY **Haizhao Yang** (yang1863@purdue.edu), *Purdue University*
- ORGANIZED BY **Senwei Liang** (liang339@purdue.edu), *Purdue University*
- CHAired BY **Richard Tsai**
- 08:00–08:30 **Richard Tsai** (ytsai@math.utexas.edu)
University of Texas at Austin
 “Numerical wave propagation and parallel-in-time computation aided by deep learning”

- 08:30–09:00 **Senwei Liang** (liang339@purdue.edu)
Purdue University
“Solving PDEs on unknown manifolds with machine learning”
- 09:00–09:30 **Lizuo Liu** (lizuol@smu.edu)
Southern Methodist University
“A Linearized Learning with Multiscale Deep Neural Network for Stationary Navier-Stokes Equations with Oscillatory Solutions”
- 09:30–10:00 **Chunmei Wang** (chunmei.wang@ufl.edu)
University of Florida
“Structure probing neural network deflation”

Saturday – Minisymposium Parallel Sessions 3

Advances in theory and applications of composite materials. Part 3

LOCATION	FALCON
ORGANIZED BY	Aaron Welters (awelters@fit.edu), <i>Florida Institute of Technology</i>
ORGANIZED BY	Anthony Stefan (astefan2015@my.fit.edu), <i>Florida Institute of Technology</i>
ORGANIZED BY	Robert Viator (rviator1@swarthmore.edu), <i>Swarthmore</i>
CHAired BY	Anthony Stefan
13:00–13:30	Yury Grabovsky (yury@temple.edu) <i>Temple University</i> “Exact relations and links for two-dimensional thermoelectric composites”
13:30–14:00	Andrej Cherkaev (cherk@math.utah.edu) <i>University of Utah</i> “Some optimal multi-material composites”
14:00–14:30	Justin Baker (baker@math.utah.edu) <i>University of Utah</i> “Optimal Design in Monge-Kantorovich Transportation Problem”
14:30–15:00	Daniel Onofrei (dtonofre@central.uh.edu) <i>University of Houston</i> “Interior approximate control of heat flow through microstructures separated by a rough interface”

Algorithmic Algebra and Geometry. Part 3

LOCATION	OSPREY
ORGANIZED BY	Alperen Ergur (alperen.ergur@utsa.edu), <i>The University of Texas San Antonio</i>
ORGANIZED BY	J. Maurice Rojas (jmauricerojas@gmail.com), <i>Texas A&M University</i>
ORGANIZED BY	Frank Sottile (sottile@tamu.edu), <i>Texas A&M University</i>
CHAired BY	J. Maurice Rojas
13:00–13:30	Rupei Xu (rupei.xu@utdallas.edu) <i>The University of Texas at Dallas</i> “Beyond Linear Algebra and Euclidean Geometry in 5G and Beyond Networks”
13:30–14:00	Zeyu Guo (zguotcs@gmail.com) <i>The University of Texas Austin</i> “Variety Evasive Subspace Families”
14:00–14:30	Carlos E. Arreche (arreche@utdallas.edu)

The University of Texas at Dallas
“Mahler residues and telescopers for rational functions”

14:30–15:00 **Alperen Ergur** (alperen.ergur@utsa.edu)
The University of Texas San Antonio
“Beyond Worst-Case Analysis for Symbolic Real Root Isolation Algorithms”

Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 3

LOCATION CARACARA

ORGANIZED BY **Bruce Wade** (bruce.wade@louisiana.edu), *University of Louisiana at Lafayette*

CHAired BY **Joshua Padgett**

13:00–13:30 **Julienne Kabre** (jkabre@nova.edu)
Nova Southeastern University
“A preservative operator splitting approximation of the solution of a variable coefficient quenching problem”

13:30–14:00 **Jacob Moore** (jacob.moore5@baylor.edu)
Baylor University
“Locally mass conservative partitioned numerical methods for poroelasticity”

14:00–14:30 **Yanzhi Zhang** (zhangyanz@mst.edu)
Missouri University of Science and Technology
“Numerical methods for the tempered fractional Laplacian and its applications”

14:30–15:00 **Yixuan Wu** (ywx7c@mst.edu)
University of Missouri System
“Unified Meshfree Pseudospectral Methods for Solving Classical and Fractional PDEs”

Mathematics and Computation in Biomedicine. Part 3

LOCATION SANDPIPER

ORGANIZED BY **Sebastian Acosta** (sebastian.acosta@bcm.edu), *Baylor College of Medicine, Houston TX*

CHAired BY **Sebastian Acosta**

13:00–13:30 **Andreas Mang** (andreas@math.uh.edu)
University of Houston
“CLAIRE: A scalable multi-GPU solver for diffeomorphic image registration in 3D”

13:30–14:00 **Cesar Uribe** (cauribe@rice.edu)
Rice University
“Optimal Transport for Federated Biomedical Signal Processing”

14:00–14:30 **Weston Baines** (bainesw1@tamu.edu)
Texas A&M University

“The range description of a conical radon transform”

14:30–15:00 **Mohammad Latifi** (mjlatici@math.arizona.edu)
University of Arizona
“V-Line transform in 2D vector tomography”

Geometry of Machine Learning

LOCATION SEAGULL

ORGANIZED BY **Eliza O’Reilly** (eoreilly@caltech.edu), *California Institute of Technology*

CHAired BY **Eliza O’Reilly**

13:00–13:30 **Eliza O’Reilly** (eoreilly@caltech.edu)
California Institute of Technology
“Stochastic Geometry for Machine Learning”

13:30–14:00 **Zehua Lai** (laizehua@uchicago.edu)
University of Chicago
“Noncommutative positivstellensatz and stochastic gradient descent”

14:00–14:30 **Tan Nguyen** (tanmnguyen89@ucla.edu)
University of California Los Angeles
“Transformer with a Mixture of Gaussian Keys”

14:30–15:00 **Oscar Leong** (oleong@caltech.edu)
California Institute of Technology
“Learned Generative Priors for Phase Retrieval”

Optimal measures and point configurations. Part 1

LOCATION SPOONBILL

ORGANIZED BY **Alexey Glazyrin** (Alexey.Glazyrin@utrgv.edu), *University of Texas Rio Grande Valley*

CHAired BY **Alexey Glazyrin**

13:00–13:30 **Dmitriy Bilyk** (dbilyk@math.umn.edu)
University of Minnesota
“Positive definiteness and energy minimization”

13:30–14:00 **Ryan Matzke** (matzke@math.tugraz.at)
TU Graz
“Estimates for energies on projective spaces”

14:00–14:30 **Alexey Garber** (alexey.garber@utrgv.edu)
University of Texas Rio Grande Valley
“Substitution tilings with transcendental inflation factor”

Reproducibility, reliability, and robustness: confronting models from across mathematical biology with data. Part 1

LOCATION	IBIS
ORGANIZED BY	Joshua Caleb Macdonald (joshua.macdonald1@louisiana.edu), <i>University of Louisiana at Lafayette</i>
ORGANIZED BY	Juan B. Gutierrez (juan.gutierrez3@utsa.edu), <i>University of Texas at San Antonio</i>
CHAired BY	Hana Dobrovolny
13:00–13:30	Hana Dobrovolny (h.dobrovolny@tcu.edu) <i>Texas Christian University</i> “Testing density-dependent infection rates for modeling of influenza”
13:30–14:00	Zhuolin Qu (zhuolin.qu@utsa.edu) <i>University of Texas at San Antonio</i> “Network modeling the impact of male-screening on the Chlamydia trachomatis prevalence in women”
14:00–14:30	Brian Pidgeon (bdpidgeon@gmail.com) <i>Georgia State University</i> “The Doubling Time Analysis for Modified Infectious Disease Richards Model with Applications to COVID-19 Pandemic. ”
14:30–15:00	Amanda Laubmeier (amanda.laubmeier@ttu.edu) <i>Texas Tech University</i> “Identifying importance of predator traits and behavior from prey abundance data”

Mathematical foundation of deep learning with the applications to PDE. Part 2

LOCATION	EGRET
ORGANIZED BY	Lizuo Liu (lizuol@smu.edu), <i>Southern Methodist University</i>
ORGANIZED BY	Haizhao Yang (yang1863@purdue.edu), <i>Purdue University</i>
ORGANIZED BY	Senwei Liang (liang339@purdue.edu), <i>Purdue University</i>
CHAired BY	Wenjing Liao
13:00–13:30	Wenjing Liao (wliao60@gatech.edu) <i>Georgia Institute of Technology</i> “Nonparametric estimation of nonlinear operators between function spaces by deep neural networks”
13:30–14:00	Xiaoliang Wan (xlwan@lsu.edu) <i>Louisiana State University</i> “A deep adaptive sampling method for solving PDEs”
14:00–14:30	Tan Nguyen (tanmnguyen89@gmail.com) <i>University of California, Los Angeles</i> “Momentum-Based and Fast Multipole Methods for Designing Deep Learning Models”

14:30–15:00 **Tan Bui** (tanbui@oden.utexas.edu)
University of Texas at Austin
“Model-constrained deep learning approaches for forward and inverse problems”

Recent Advances in Model Order Reduction and Applications in Inverse Problems

LOCATION HERON

ORGANIZED BY **Alexander Mamonov** (mamonov@math.uh.edu), *University of Houston*

ORGANIZED BY **Maxim Olshanskii** (maolshanskiy@uh.edu), *University of Houston*

CHAired BY **Maxim Olshanskii**

13:00–13:24 **Traian Iliescu** (iliescu@vt.edu)
Virginia Tech
“ROM Closures and Stabilizations for Convection-Dominated, Under-Resolved Flows”

13:24–13:48 **Vladimir Druskin** (vdruskin@wpi.edu)
Worcester Polytechnic Institute
“Lippmann-Schwinger-Lanczos algorithm for inverse scattering problems”

13:48–14:12 **Jorn Zimmerling** (jzimmerl@umich.edu)
University of Michigan
“Imaging and inverse scattering using ROM estimates of internal waves”

14:12–14:36 **Ruhui Jin** (rhjin@math.utexas.edu)
University of Texas Austin
“Tensor-structured sketching for constrained least squares”

14:36–15:00 **Alexander Mamonov** (mamonov@math.uh.edu)
University of Houston
“Interpolatory tensorial reduced order models for parametric dynamical systems”

Saturday – Minisymposium Parallel Sessions 4

Advances in theory and applications of composite materials. Part 4

- LOCATION FALCON
- ORGANIZED BY *Aaron Welters* (awelters@fit.edu), *Florida Institute of Technology*
- ORGANIZED BY *Anthony Stefan* (astefan2015@my.fit.edu), *Florida Institute of Technology*
- ORGANIZED BY *Robert Viator* (rviator1@swarthmore.edu), *Swarthmore*
- CHAired BY *Robert Viator*
- 16:30–17:00 **Kenneth M. Golden** (golden@math.utah.edu)
University of Utah
“On Thinning Ice: Modeling Sea Ice as a Multiscale Composite Material”
- 17:00–17:30 **Elena Cherkaev** (elena@math.utah.edu)
University of Utah
“Model reduction for viscoelastic materials: Hidden variables and internal scales in composites ”
- 17:30–18:00 **Kshiteej Deshmukh** (kshiteej.jd@gmail.com)
Carnegie Mellon University
“Multiband homogenization of metamaterials in Real-Space”
- 18:00–18:30 **Davit Harutyunyan** (harutyunyan@ucsb.edu)
University of California Santa Barbara
“On the extreme rays of the convex cone of 3 by 3 quasiconvex quadratic forms ”

Algorithmic Algebra and Geometry. Part 4

- LOCATION OSPREY
- ORGANIZED BY *Alperen Ergur* (alperen.ergur@utsa.edu), *The University of Texas San Antonio*
- ORGANIZED BY *J. Maurice Rojas* (jmauricerojas@gmail.com), *Texas A&M University*
- ORGANIZED BY *Frank Sottile* (sottile@tamu.edu), *Texas A&M University*
- CHAired BY *Alperen Ergur*
- 16:30–17:00 **Jordy Lopez Garcia** (jordy.lopez@tamu.edu)
Texas A&M University
“Using Macaulay2 To Count Real Roots of Univariate Polynomials”
Joint work with Frank Sottile, Thomas Yahl and Kelly Maluccio.
- 17:00–17:30 **Erick Boniface** (embonifa@ncsu.edu)
North Carolina State University
“Trinomials and Complexity Limits Over the Reals ”

- 17:30–18:00 **Weixun Deng** (deng15521037237@tamu.edu)
Texas A&M University
 “Randomization in Solving and Diophantine Approximation”
 Joint work with Weixun Deng, Alperen Ergur, and Grigoris Paouris
- 18:00–18:30 **Joshua Goldstein** (jgoldstein345@tamu.edu)
Texas A&M University
 “On Extremal Trinomials over the p -adic Rationals”

Mathematics and Computation in Biomedicine. Part 4

- LOCATION CARACARA
- ORGANIZED BY **Sebastian Acosta** (sebastian.acosta@bcm.edu), *Baylor College of Medicine, Houston TX*
- CHAired BY **Charles Puelz**
- 16:30–17:00 **Arko Barman** (arko.barman@rice.edu)
Rice University
 “Leveraging brain symmetry in CT and CTA images for diagnosis and treatment of Ischemic Stroke & Hemorrhage”
- 17:00–17:30 **Negar Orangi-Fard** (norangifard@ggc.edu)
Georgia Gwinnett College
 “Prediction of chronic obstructive pulmonary disease”
- 17:30–18:00 **Bo Zhao** (bozhao@utexas.edu)
University of Texas at Austin
 “Optimized Magnetic Resonance Fingerprinting with Statistical Learning and Inference”
- 18:00–18:30 **Ali Ghafouri** (ghafouri@utexas.edu)
University of Texas at Austin
 “Inverse modeling in neurooncology”

High-order structure preserving techniques for simulating transport phenomena and fluids. Part 1

- LOCATION SANDPIPER
- ORGANIZED BY **Bennett Clayton** (bgclayto@tamu.edu), *Texas A&M University*
- ORGANIZED BY **Jesse Chan** (jesse.chan@rice.edu), *Rice University*
- ORGANIZED BY **Eirik Valseth** (eirik@utexas.edu), *The University of Texas at Austin*
- ORGANIZED BY **Eric Tovar** (ejtovar1@tamu.edu), *Texas A&M University*
- CHAired BY **Bennett Clayton**
- 16:30–17:00 **Tarik Dzanic** (tdzanic@tamu.edu)
Texas A&M University

“Bounds Preserving Temporal Integration Methods for Hyperbolic Conservation Laws”

17:00–17:30 **Jean-Luc Guermond** (guermond@tamu.edu)

Texas A&M University

“Invariant-domain-preserving explicit Runge–Kutta time stepping”

17:30–18:00 **Robert Kirby** (robert_kirby@baylor.edu)

Baylor University

“Bounds-constrained polynomial approximation using the Bernstein basis”

18:00–18:30 **Madison Sheridan** (sheridanm@tamu.edu)

Texas A&M University

“High-order invariant domain preserving approximation of the gray radiation equations”

Dispersive Wave Equations with Applications in Optics and Fluids. Part 1

LOCATION SEAGULL

ORGANIZED BY **Ross Parker** (rhparker@smu.edu), *Southern Methodist University*

ORGANIZED BY **Brian Choi** (choighmath@gmail.com), *Southern Methodist University*

CHAired BY **Ross Parker**

16:30–17:00 **Yannan Shen** (yshen@ku.edu)

University of Kansas

“Regularity of a family of water wave equations”

17:00–17:30 **Akif Ibraguimov** (akif.ibraguimov@ttu.edu)

Texas Tech University

“On finite speed of propagation for degenerate Einstein equation”

17:30–18:00 **Ross Parker** (rhparker@smu.edu)

Southern Methodist University

Joint work with Alejandro Aceves

“Standing wave solutions in twisted multicore fibers”

18:00–18:30 **Brian Choi** (choighmath@gmail.com)

Southern Methodist University

“Well-posedness of mixed fractional nonlinear Schrödinger equation”

Optimal measures and point configurations. Part 2

LOCATION SPOONBILL

ORGANIZED BY **Alexey Glazyrin** (Alexey.Glazyrin@utrgv.edu), *University of Texas Rio Grande Valley*

CHAired BY **Dmitriy Bilyk**

16:30–17:00 **Josiah Park** (j.park@tamu.edu)

Texas A&M University

“Optimal energy for hard-spheres and equiangular lines”

17:00–17:30 **Oleksandr Vlasiuk** (oleksandr.vlasiuk@vanderbilt.edu)

Vanderbilt University

“Clustering phenomena for short-range interactions”

17:30–18:00 **Alexey Glazyrin** (Alexey.Glazyrin@utrgv.edu)

University of Texas Rio Grande Valley

“Price of SDP relaxations for spherical codes”

Reproducibility, reliability, and robustness: confronting models from across mathematical biology with data. Part 2

LOCATION IBIS

ORGANIZED BY **Joshua Caleb Macdonald** (joshua.macdonald1@louisiana.edu), *University of Louisiana at Lafayette*

ORGANIZED BY **Juan B. Gutierrez** (juan.gutierrez3@utsa.edu), *University of Texas at San Antonio*

CHAired BY **Joshua Caleb Macdonald**

16:30–17:00 **Joshua Caleb Macdonald** (joshua.macdonald1@louisiana.edu)

University of Louisiana at Lafayette

“Infectious disease dynamics necessarily operate across biological scales”

17:00–17:30 **Ming Zhong** (mingzhong@tamu.edu)

Texas A&M University

“Machine Learning for Discovering Effective Interaction Kernels between Celestial Bodies from Ephemerides”

17:30–18:00 **Juan B. Gutierrez** (juan.gutierrez3@utsa.edu)

University of Texas at San Antonio

“Maximizing the Accuracy of COVID-19 Forecasting via Data Rectification”

18:00–18:30 **Quiyana Murphy** (Qmurphy@vt.edu)

Virginia Tech

“TCDD alters follicular homeostasis and aggravates autoimmunity in adult lupus mice”

Algebraic and Geometric Aspects of Integrable Systems. Part 1

LOCATION EGRET

ORGANIZED BY **Zhijun Qiao** (zhijun.qiao@utrgv.edu), *University of Texas Rio Grande Valley*

ORGANIZED BY **Erwin Suazo** (erwin.suazo@utrgv.edu), *University of Texas Rio Grande Valley*

ORGANIZED BY **Vesselin Vatchev** (vesselin.vatchev@utrgv.edu), *University of Texas Rio Grande Valley*

ORGANIZED BY **W.A. Zuniga-Galindo** (wilson.zunigagalindo@utrgv.edu), *University of Texas Rio Grande Valley*

- CHAired BY **Erwin Suazo**
- 16:30–17:00 **W.A. Zuniga-Galindo** (wilson.zunigagalindo@utrgv.edu)
University of Texas Rio Grande Valley
“*p*-Adic Neural Networks”
- 17:00–17:30 **Emer Lopera** (edloperar@unal.edu.co)
Universidad Nacional de Colombia, Colombia
“Qualitative behaviour of the solutions to a quasilinear problem from a generalized Pohozaev’s Identity”
- 17:30–18:00 **Zhijun Qiao** (zhijun.qiao@utrgv.edu)
University of Texas Rio Grande Valley
“Integrable high order CH type models with pseudo-peaks”
Joint work with Dr. Baoqiang Xia, Dr. Mingxuan Zhu, and Dr. Enrique Reyes.
- 18:00–18:30 **Shuxia Li** (shuxia.li@utrgv.edu)
University of Texas Rio Grande Valley
“Commutator Representations for a hierarchy of integrable equations”

Spectral theory of discrete and continuous models in quantum mechanics. Part 1

- LOCATION HERON
- ORGANIZED BY **Rui Han** (rhan@lsu.edu), *Louisiana State University*
- ORGANIZED BY **Stephen Shipman** (shipman@lsu.edu), *Louisiana State University*
- CHAired BY **Rui Han**
- 16:30–17:00 **Giorgio Young** (giorgio.young@gmail.com)
Rice University
“Ballistic transport for limit-periodic continuum Schrödinger operators in one dimension”
- 17:00–17:30 **Wencai Liu** (wencail@tamu.edu)
Texas A&M University
“Fermi isospectrality for discrete periodic Schrodinger operators”
- 17:30–18:00 **Jake Fillman** (fillman@txstate.edu)
Texas State University
“Spectral approximation for quasiperiodic Jacobi operators”
- 18:00–18:30 **Ethan Gwaltney** (ewg3@rice.edu)
Rice University
“Stahl-Totik Regularity for Dirac Operators”
Joint work with Benjamin Eichinger and Milivoje Lukic.

Complex adaptive systems in Life and Social Sciences. Part 1

LOCATION PELICAN

- ORGANIZED BY **Lucero Rodriguez Rodriguez** (lrodri68@asu.edu), *Arizona State University*
- ORGANIZED BY **Yun Kang** (lun.kang@asu.edu), *Arizona State University*
- ORGANIZED BY **Jordy Cevallos-Chavez** (jcevall1@asu.edu), *Arizona State University*
- CHAired BY **Carlos Bustamante Orellana**
- 16:30–17:00 **Hayriye Gulbudak** (hayriye.gulbudak@louisiana.edu)
University of Louisiana at Lafayette
“Differential impacts of contact tracing and lockdowns on outbreak size in COVID-19 model applied to China”
- 17:00–17:30 **Zhaosheng Feng** (zhaosheng.feng@utrgv.edu)
University of Texas Rio Grande Valley
“Dynamics of a degenerate parabolic system”
- 17:30–18:00 **Peter Hinow** (hinow@uwm.edu)
University of Wisconsin - Milwaukee
“Tiny Giants - Mathematics Looks at Zooplankton”
- 18:00–18:30 **Cristina Villalobos** (cristina.villalobos@utrgv.edu)
University of Texas Rio Grande Valley
“Optimal control with MANF treatment of photoreceptor degeneration ”

Sunday – Minisymposium Parallel Sessions 5

Redistricting: Mathematical and Political Perspectives

LOCATION	FALCON
ORGANIZED BY	Andrea Barreiro (abarreiro@smu.edu), <i>Southern Methodist University</i>
CHAired BY	A.K. Barreiro, B. Stigler
08:00–08:30	Joaquin Gonzalez (joaquin@texascivilrightsproject.org) <i>Texas Civil Rights Project</i> “Where the Rubber Meets the Road: Introducing Political, Historical, and Legal Complexities into the Equation”
08:30–09:00	Scott Cook (scook@tarleton.edu) <i>Tarleton State University</i> “Improved Recombination MCMC with 2020 Census Results For Texas Redistricting”
09:00–09:30	Anne Egelston (egelston@tarleton.edu) <i>Tarleton State University</i> “Validating Mathematical Assumptions: A political science perspective”
09:30–10:00	Betseygail Rand (brand@tlu.edu) <i>Texas Lutheran University</i> Will Hager (whager@tlu.edu) <i>Texas Lutheran University</i> “Residential Segregation Patterns and Single Member Voting Districts: When is a fair district plan available?”

Dispersive Wave Equations with Applications in Optics and Fluids. Part 2

LOCATION	OSPREY
ORGANIZED BY	Ross Parker (rhparker@smu.edu), <i>Southern Methodist University</i>
ORGANIZED BY	Brian Choi (choighmath@gmail.com), <i>Southern Methodist University</i>
CHAired BY	Brian Choi
08:00–08:30	Michael Hott (michael.hott@math.utexas.edu) <i>University of Texas at Austin</i> Joint work with Thomas Chen “On the emergence of a quantum Boltzmann equation in the presence of a Bose-Einstein condensate”
08:30–09:00	Jacky Chong (jwchong@math.utexas.edu) <i>The University of Texas at Austin</i> “Dynamical Hartree–Fock–Bogoliubov approximation of interacting bosons ”

Algebraic and Geometric Aspects of Integrable Systems. Part 2

- LOCATION CARACARA
- ORGANIZED BY **Zhijun Qiao** (zhijun.qiao@utrgv.edu), *University of Texas Rio Grande Valley*
- ORGANIZED BY **Erwin Suazo** (erwin.suazo@utrgv.edu), *University of Texas Rio Grande Valley*
- ORGANIZED BY **Vesselin Vatchev** (vesselin.vatchev@utrgv.edu), *University of Texas Rio Grande Valley*
- ORGANIZED BY **W.A. Zuniga-Galindo** (wilson.zunigagalindo@utrgv.edu), *University of Texas Rio Grande Valley*
- CHAired BY **Zhijun Qiao**
- 08:00–08:30 **Dambaru Bhatta** (dambaru.bhatta@utrgv.edu)
University of Texas Rio Grande Valley
“Convective flow analysis in solidification of binary alloys”
- 08:30–09:00 **Yufeng Zhang** (zhang_yu_f@163.com)
Beijing University of Technology
Joint work with Jing Li.
“Asymptotical stability of Riemann-Liouville fractional neutral systems with multiple discrete delays”
- 09:00–09:30 **Shaotao Zhu** (zhushaotao@bjut.edu.cn)
Beijing University of Technology
Joint work with Jing Li and Ji Zhou.
“Multiple periodic vibrations of auxetic honeycomb sandwich plates with 1:2 internal resonance”

Numerical methods for problems with interfaces and surface PDEs. Part 1

- LOCATION SANDPIPER
- ORGANIZED BY **Maxim A. Olshanskii** (maxim.olshanskii@gmail.com), *University of Houston*
- CHAired BY **Andrea Bonito**
- 08:00–08:30 **Andrea Bonito** (bonito@math.tamu.edu)
Texas A&M University
“Numerical Approximations of Curved Origamis”
- 08:30–09:00 **Maxim Olshanskii** (molshan@math.uh.edu)
University of Houston
“A finite element method for two-phase surface fluids and modeling of multicomponent lipid membranes”
- 09:00–09:30 **Abner J. Salgado** (asalgad1@utk.edu)
University of Tennessee
“Analysis and approximation of fluids under singular forcing”
- 09:30–10:00 **Alan Demlow** (demlow@math.tamu.edu)

Numerical methods for multi-phase flows in porous media

LOCATION	SEAGULL
ORGANIZED BY	Loic Cappanera (lmcappan@central.uh.edu), <i>University of Houston</i>
CHAired BY	Loic Cappanera
08:00–08:30	Maria Vasilyeva (maria.vasilyeva@tamucc.edu) <i>Texas A&M University - Corpus Christi</i> "Learning macroscopic parameters in multiscale simulations of multi-phase flows in porous media"
08:30–09:00	Mohammad Sarraf Joshaghani (m.sarraf.j@rice.edu) <i>Rice University</i> "A discontinuous Galerkin method with bound-preserving limiters for two-phase immiscible flow"
09:00–09:30	Chenyu Tian (chenyu@ices.utexas.edu) <i>Oden Institute, University of Texas at Austin</i> "Simulation of Multiphase Flow and Transport in Partially Melted Materials"
09:30–10:00	Giselle Sosa Jones (ggsosajo@central.uh.edu) <i>University of Houston</i> "Existence and convergence of a DG method for three phase flows in porous media"

High-order structure preserving techniques for simulating transport phenomena and fluids. Part 2

LOCATION	SPOONBILL
ORGANIZED BY	Bennett Clayton (bgclayto@tamu.edu), <i>Texas A&M University</i>
ORGANIZED BY	Jesse Chan (jesse.chan@rice.edu), <i>Rice University</i>
ORGANIZED BY	Eirik Valseth (eirik@utexas.edu), <i>The University of Texas at Austin</i>
ORGANIZED BY	Eric Tovar (ejtovar1@tamu.edu), <i>Texas A&M University</i>
CHAired BY	Jesse Chan
08:00–08:30	Eirik Valseth (eirik@utexas.edu) <i>The University of Texas at Austin</i> "Goal-Oriented Error Estimation for the Shallow Water Equations"
08:30–09:00	Eric Tovar (ejtovar1@tamu.edu) <i>Texas A&M University</i> "Well-balanced second-order convex limiting technique for solving the Serre equations"

- 09:00–09:30 **Bennett Clayton** (bgclayto@tamu.edu)
Texas A&M University
“Invariant-Domain Preserving Approximation of the Compressible Euler Equations with Tabulated Equations of State”
- 09:30–10:00 **Yimin Lin** (yiminlin@rice.edu)
Rice University
“A positivity preserving strategy for entropy stable discontinuous Galerkin discretizations of the compressible Euler and Navier-Stokes equations”

Applications of Algebra in Mathematical Physics and Integrable Systems. Part 1

- LOCATION IBIS
- ORGANIZED BY **Baofeng Feng** (baofeng.feng@utrgv.edu), *University of Texas Rio Grande Valley*
- ORGANIZED BY **Stepehn Anco** (sanco@brockc.edu), *Brock University, Canada*
- ORGANIZED BY **Hamidreza Ramezani** (hamidreza.ramezani@utrgv.edu), *University of Texas Rio Grande Valley*
- CHAired BY **Stepehn Anco**
- 08:00–08:30 **Hamidreza Ramezani** (hamidreza.ramezani@utrgv.edu)
University of Texas Rio Grande Valley
“Anomalous topological effects”
- 08:30–09:00 **Hamed Ghaemidzicheh** (hamed.ghaemidzicheh@utrgv.edu)
University of Texas Rio Grande Valley
“Asymmetric Localization by Second Harmonic Generation”
Joint work with Baofeng Feng, Hamidreza Ramezani
- 09:00–09:30 **Masoumeh (Sara) Izadparast** (masoumeh.izadparast@utrgv.edu)
University of Texas Rio Grande Valley
“Modified EP-Based Ring Laser Gyros”
Joint work with Gururaj Naik, Hamidreza Ramezani
- 09:30–10:00 **Baofeng Feng** (baofeng.feng@utrgv.edu)
University of Texas Rio Grande Valley
“Discrete KP equation:generating function to integrable systems”

Recent developments in finite element methods. Part 1

- LOCATION EGRET
- ORGANIZED BY **Cuiyu He** (cuiyu.he@utrgv.edu), *University of Texas Rio Grande Valley*
- CHAired BY **Xu Zhang**
- 08:00–08:30 **Xu Zhang** (xzhang@okstate.edu)
Oklahoma State University

“A High-Order Immersed C0 Interior Penalty Method for Biharmonic Interface Problems”

Joint work with Yuan Chen

- 08:30–09:00 **Ruchi Guo** (ruchig@uci.edu)
University of California, Irvine
“An Immersed Virtual Element Method for Solving H^1 and $H(\text{curl})$ Interface problems”
- 09:00–09:30 **Natasha S Sharma** (nssharma@utep.edu)
University of Texas at El Paso
“First-Order Time Stepping schemes for sixth-order Cahn-Hilliard type equations modeling microemulsions ”
- 09:30–10:00 **Lin Mu** (linmu@uga.edu)
University of Georgia
“Pressure robust scheme for incompressible flow”

Spectral theory of discrete and continuous models in quantum mechanics. Part 2

LOCATION HERON

ORGANIZED BY **Rui Han** (rhan@lsu.edu), *Louisiana State University*

ORGANIZED BY **Stephen Shipman** (shipman@lsu.edu), *Louisiana State University*

CHAired BY **Stephen Shipman**

08:00–08:30 **Rodrigo Matos** (matosrod@tamu.edu)
Texas A&M University
“Irreducibility of the Bloch Variety for Finite-Range Schrödinger Operators”
Joint work with Jake Fillman and Wencai Liu

08:30–09:00 **Frank Sottile** (sottile@math.tamu.edu)
Texas A&M University
“Toric compactifications and discrete periodic operators”

09:00–09:30 **Matthew Faust** (mfaust@math.tamu.edu)
Texas A&M University
“The number of critical points of discrete periodic operators”
Joint work with Frank Sottile

09:30–10:00 **Jorge Villalobos** (jvill38@lsu.edu)
Louisiana State University
“Reducibility of the Fermi surface for magnetic Schrödinger graph operators”

Complex adaptive systems in Life and Social Sciences. Part 2

LOCATION PELICAN

ORGANIZED BY **Lucero Rodriguez Rodriguez** (lrodri68@asu.edu), *Arizona State University*

ORGANIZED BY **Yun Kang** (lun.kang@asu.edu), *Arizona State University*

ORGANIZED BY **Jordy Cevallos-Chavez** (jcevall1@asu.edu), *Arizona State University*

CHAired BY **Yun Kang**

08:00–08:30 **Md Rafiul Islam** (rafiul@iastate.edu)
Iowa State University
“Evaluation of the United States COVID-19 Vaccine Allocation Strategy”

08:30–09:00 **Saber Elaydi** (selaydi@trinity.edu)
Trinity University
“ On some discrete-time epidemic models”

09:00–09:30 **Carlos Bustamante Orellana** (cbustam3@asu.edu)
Arizona State University
“Understanding the dynamics of human reliance and trust on automation”

09:30–10:00 **Lucero Rodriguez Rodriguez** (lrodri68@asu.edu)
Arizona State University
“The harvesting effect of Pacific Yew for cancer treatment on the ecosystem: Mathematical modeling approach”

Sunday – Minisymposium Parallel Sessions 6

Algebraic and Geometric Aspects of Integrable Systems. Part 3

- LOCATION FALCON
- ORGANIZED BY **Zhijun Qiao** (zhijun.qiao@utrgv.edu), *University of Texas Rio Grande Valley*
- ORGANIZED BY **Erwin Suazo** (erwin.suazo@utrgv.edu), *University of Texas Rio Grande Valley*
- ORGANIZED BY **Jing Li** (mathabc@163.com), *Beijing University of Technology*
- ORGANIZED BY **W.A. Zuniga-Galindo** (wilson.zunigagalindo@utrgv.edu), *University of Texas Rio Grande Valley*
- CHAired BY **Wilson Zuniga-Galindo**
- 10:15–10:45 **Mallikarjunaiah Muddamallappa** (M.Muddamallappa@tamucc.edu)
Texas A & M University - Corpus Christi
“Phase-field simulation of quasi-static crack propagation in strain-limiting elastic bodies”
- 10:45–11:15 **Erwin Suazo** (erwin.suazo@utrgv.edu)
University of Texas Rio Grande Valley
“On explicit and numerical solutions for stochastic partial differential equations”
- 11:15–11:45 **Vesselin Vatchev** (vesselin.vatchev@utrgv.edu)
University of Texas Rio Grande Valley
“On Non-Linear Superposition Principle for Some Classes of Solitons”
- 11:45–12:15 **Julio Cesar Paez** (julio.paez01@utrgv.edu)
University of Texas Rio Grande Valley
“Applying the Method of Asymptotic Expansion to Approximate Two-Soliton Solutions for Nonlinear PDEs”

Advances in Krylov subspaces, preconditioning and analysis.

- LOCATION OSPREY
- ORGANIZED BY **Josef Sifuentes** (josef.sifuentes@utrgv.edu), *University of Texas Rio Grande Valley*
- CHAired BY **Josef Sifuentes**
- 10:15–10:45 **Josef Sifuentes** (josef.sifuentes@utrgv.edu)
University of Texas Rio Grande Valley
“GMRES Convergence and Spectral Properties of Approximate Preconditioners for KKT matrices”
Joint work with Mark Embree, Gilbert Ymbert
- 10:45–11:15 **Miguel Mascorro** (miguel.mascorro01@utrgv.edu)
University of Texas Rio Grande Valley
“The Bridge Between the Field of Values and Systems of Linear Equations”

Joint work with Josef Sifuentes

11:15–11:45 **Jesus Saldana** (jesus.saldana01@utrgv.edu)
University of Texas Rio Grande Valley
“Preconditioned Iterative Methods for Inhomogeneous Acoustic Scattering Application with Variable Index of Refraction”
Joint work with Josef Sifuentes

Numerical methods for problems with interfaces and surface PDEs. Part 2

LOCATION CARACARA

ORGANIZED BY **Maxim A. Olshanskii** (maxim.olshanskii@gmail.com), *University of Houston*

CHAired BY **Alan Demlow**

10:15–10:45 **Alexander Zhiliakov** (alex@math.uh.edu)

“Stability and convergence of trace finite element methods for surface fluid flows”

10:45–11:15 **Diane Guignard** (dguignar@uottawa.ca)

University of Ottawa

“Large deformation of prestrained plates: reduced model and numerical simulation using an LDG approach”

Spectral theory of discrete and continuous models in quantum mechanics. Part 3

LOCATION SANDPIPER

ORGANIZED BY **Rui Han** (rhan@lsu.edu), *Louisiana State University*

ORGANIZED BY **Stephen Shipman** (shipman@lsu.edu), *Louisiana State University*

CHAired BY **Jake Fillman**

10:15–10:45 **Jonathan Stanfill** (jonathan.stanfill@baylor.edu)

Baylor University

“Spectral zeta functions for singular Sturm–Liouville operators and the generalized Bessel equation”

Joint work with Guglielmo Fucci, Fritz Gesztesy, and Klaus Kirsten

10:45–11:15 **Selim Sukhtaiev** (szs0266@auburn.edu)

Auburn University

“Asymptotic perturbation theory for extensions of symmetric operators”

11:15–11:45 **Fan Yang** (yangf@lsu.edu)

Louisiana State University

“Sharp analysis of localization with two types of arithmetic resonances: Maryland model for all parameters”

Joint work with Rui Han and Svetlana Jitomirskaya

11:45–12:15 **Cosmas Kravaris** (cosmaskravaris@tamu.edu)

Texas A&M University

“On the density of the pure point spectrum of periodic difference operators”

High-order structure preserving techniques for simulating transport phenomena and fluids. Part 3

LOCATION SEAGULL

ORGANIZED BY **Bennett Clayton** (bgclayto@tamu.edu), *Texas A&M University*

ORGANIZED BY **Jesse Chan** (jesse.chan@rice.edu), *Rice University*

ORGANIZED BY **Eirik Valseth** (eirik@utexas.edu), *The University of Texas at Austin*

ORGANIZED BY **Eric Tovar** (ejtovar1@tamu.edu), *Texas A&M University*

CHAired BY **Eirik Valseth**

10:15–10:45 **Rami Masri** (ramimasri14@gmail.com)
Texas A&M University
“Stability and convergence of high order discontinuous Galerkin methods for incompressible flow”

10:45–11:15 **Loic Cappanera** (lmcappan@central.uh.edu)
University of Houston
“Projection and artificial compression methods for incompressible multiphase flows”

11:15–11:45 **Md Mahmudul Hasan** (mhasan5@miners.utep.edu)
University of Texas at El Paso
“A high order compact hybrid variable method with application to inviscid compressible flow problems”

11:45–12:15 **Ignacio Tomas** (nachotet@gmail.com)
Sandia National Laboratories
“Compressible Navier-Stokes: numerical schemes with mathematically guaranteed properties.”

Efficacy and safety statistics of COVID-19 treatment and prophylaxis protocols

LOCATION SPOONBILL

ORGANIZED BY **Eleftherios Gkioulekas** (eleftherios.gkioulekas@utrgv.edu), *University of Texas Rio Grande Valley*

ORGANIZED BY **Leisha Martin** (leisha.martin@tamucc.edu), *Texas A&M University-Corpus Christi*

CHAired BY **Eleftherios Gkioulekas**

10:15–10:45 **Harvey Risch** (harvey.risch@yale.edu)
Yale University
“Hydroxychloroquine and Other Outpatient Treatments for Covid-19, with Critique of Epidemiologic Methods”

- 10:45–11:15 **David Wiseman** (synechion@aol.com)
Synechion, Inc.
 “Re-analysis of policy-shaping studies on hydroxychloroquine and ivermectin reverses original findings to yield significant benefits. Review in the context of regulatory decisions on vaccines.”
- 11:15–11:45 **Leisha Martin** (leisha.martin@tamucc.edu)
Texas A&M University-Corpus Christi
 “Medical Countermeasures: Analysis and Assessment of COVID-19 Prevention and Early Treatment Approaches and Shortfalls”
- 11:45–12:15 **Eleftherios Gkioulekas** (eleftherios.gkioulekas@utrgv.edu)
University of Texas Rio Grande Valley
 “Frequentist and Bayesian analysis methods for case series data for the early out-patient treatment of COVID-19”

Applications of Algebra in Mathematical Physics and Integrable Systems. Part 2

- LOCATION IBIS
- ORGANIZED BY **Baofeng Feng** (baofeng.feng@utrgv.edu), *University of Texas Rio Grande Valley*
- ORGANIZED BY **Stepehn Anco** (sanco@brockc.edu), *Brock University, Canada*
- ORGANIZED BY **Hamidreza Ramezani** (hamidreza.ramezani@utrgv.edu), *University of Texas Rio Grande Valley*
- CHAired BY **Baofeng Feng**
- 10:15–10:45 **Stepehn Anco** (sanco@brockc.edu)
Brock University, Canada
 “New integrable peakon equations”
- 10:45–11:15 **Elena Poletaeva** (elena.poletaeva@utrgv.edu)
University of Texas Rio Grande Valley
 “Yangians and Finite W -algebras”
 Joint work with V. Serganova
- 11:15–11:45 **Steven Rayan** (rayan@math.usask.ca)
University of Saskatchewan
 “Integrable systems on Nakajima quiver varieties”
- 11:45–12:15 **Anton Dzhamay** (anton.dzhamay@unco.edu)
University of Northern Colorado
 “Different Hamiltonians for Painleve Equations and their identification using geometry of the space of initial conditions”

Recent developments in finite element methods. Part 2

- LOCATION EGRET
- ORGANIZED BY **Cuiyu He** (cuiyu.he@utrgv.edu), *University of Texas Rio Grande Valley*

CHAired BY **Cuiyu He**

10:15–10:45 **Cuiyu He** (cuiyu.he@utrgv.edu)
University of Texas at Rio Grand Valley
 “Cut Finite Element Method and its Application to Shape Optimization”

10:45–11:15 **Son-Young Yi** (syi@utep.edu)
University of Texas at El Paso
 “A locking-free enriched Galerkin method for linear elasticity.”

Complex adaptive systems in Life and Social Sciences. Part 3

LOCATION HERON

ORGANIZED BY **Lucero Rodriguez Rodriguez** (lrdr68@asu.edu), *Arizona State University*

ORGANIZED BY **Yun Kang** (yun.kang@asu.edu), *Arizona State University*

ORGANIZED BY **Jordy Cevallos-Chavez** (jcevall1@asu.edu), *Arizona State University*

CHAired BY **Lucero Rodriguez Rodriguez**

10:15–10:45 **Cameron Browne** (cameron.browne@louisiana.edu)
University of Louisiana at Lafayette
 “Modeling COVID-19 outbreaks in United States with distinct testing, lockdown speed and fatigue rates”

10:45–11:15 **Tamer Oraby** (tamer.oraby@utrgv.edu)
The University of Texas Rio Grande Valley
 “Network modeling of Social Learning of Vaccination and Disease Spread”

11:15–11:45 **Amy Veprauskas** (amy.veprauskas@louisiana.edu)
University of Louisiana at Lafayette
 “Examining the effect of frequency-dependent and independent selection on the dynamics of a predator-prey system”

11:45–12:15 **Yun Kang** (yun.kang@asu.edu)
Arizona State University
 “Dynamics of task allocation in social insect colonies: Scaling effects of colony size versus work activities”