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

SIAM-TXLA ORGANIZING COMMITTEE

<table>
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<th>Name</th>
<th>Institution</th>
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<tbody>
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<td>Beatrice Riviere</td>
<td>Rice University</td>
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<td>Tan Bui-Thanh</td>
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<td>Yifei Lou</td>
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<td>Andrea Barreiro</td>
<td>Southern Methodist University</td>
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<td>Andrea Bonito</td>
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<td>Chevron Corporation</td>
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<td>Stephen Shipman</td>
<td>Louisiana State University</td>
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<td>Thomas Hagstrom</td>
<td>Southern Methodist University</td>
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</tbody>
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UTRGV ORGANIZING COMMITTEE

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</tr>
</tbody>
</table>
## Contents

1. **Program for Friday, November 5, 2021**

2. **Program for Saturday, November 6, 2021**

3. **Program for Sunday, November 7, 2021**

4. **Friday – Minisymposium Parallel Sessions 1**
   - 4.1 Advances in theory and applications of composite materials. Part 1
   - 4.2 Algorithmic Algebra and Geometry. Part 1
   - 4.3 Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 1
   - 4.4 Mathematics and Computation in Biomedicine. Part 1
   - 4.5 Finite element and related methods for challenging problems. Part 1
   - 4.6 Computational Methods in Wave Theory. Part 1

5. **Saturday – Minisymposium Parallel Sessions 2**
   - 5.1 Advances in theory and applications of composite materials. Part 2
   - 5.2 Algorithmic Algebra and Geometry. Part 2
   - 5.3 Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 2
   - 5.4 Mathematics and Computation in Biomedicine. Part 2
   - 5.5 Recent advances in Image processing and Data Sciences
   - 5.6 Finite element and related methods for challenging problems. Part 2
   - 5.7 Computational Methods in Wave Theory. Part 2
   - 5.8 Mathematical foundation of deep learning with the applications to PDE. Part 1

6. **Saturday – Minisymposium Parallel Sessions 3**
   - 6.1 Advances in theory and applications of composite materials. Part 3
   - 6.2 Algorithmic Algebra and Geometry. Part 3
   - 6.3 Operator Splitting Methods and Adaptive Schemes for Systems of Nonlinear Evolution Equations. Part 3
   - 6.4 Mathematics and Computation in Biomedicine. Part 3
   - 6.5 Geometry of Machine Learning
   - 6.6 Optimal measures and point configurations. Part 1
   - 6.7 Reproducibility, reliability, and robustness: confronting models from across mathematical biology with data. Part 1
   - 6.8 Mathematical foundation of deep learning with the applications to PDE. Part 2
   - 6.9 Recent Advances in Model Order Reduction and Applications in Inverse Problems

7. **Saturday – Minisymposium Parallel Sessions 4**
   - 7.1 Advances in theory and applications of composite materials. Part 4
   - 7.2 Algorithmic Algebra and Geometry. Part 4
   - 7.3 Mathematics and Computation in Biomedicine. Part 4
   - 7.4 High-order structure preserving techniques for simulating transport phenomena and fluids. Part 1
   - 7.5 Dispersive Wave Equations with Applications in Optics and Fluids. Part 1
   - 7.6 Optimal measures and point configurations. Part 2
   - 7.7 Reproducibility, reliability, and robustness: confronting models from across mathematical biology with data. Part 2
   - 7.8 Algebraic and Geometric Aspects of Integrable Systems. Part 1
   - 7.9 Spectral theory of discrete and continuous models in quantum mechanics. Part 1
   - 7.10 Complex adaptive systems in Life and Social Sciences. Part 1

8. **Sunday – Minisymposium Parallel Sessions 5**
   - 8.1 Redistricting: Mathematical and Political Perspectives
   - 8.2 Dispersive Wave Equations with Applications in Optics and Fluids. Part 2
   - 8.3 Algebraic and Geometric Aspects of Integrable Systems. Part 2
   - 8.4 Numerical methods for problems with interfaces and surface PDEs. Part 1
   - 8.5 Numerical methods for multi-phase flows in porous media
   - 8.6 High-order structure preserving techniques for simulating transport phenomena and fluids. Part 2
   - 8.7 Applications of Algebra in Mathematical Physics and Integrable Systems. Part 1
   - 8.8 Recent developments in finite element methods. Part 1
   - 8.9 Spectral theory of discrete and continuous models in quantum mechanics. Part 2
   - 8.10 Complex adaptive systems in Life and Social Sciences. Part 2

2
9 Sunday – Minisymposium Parallel Sessions 6

9.1 Algebraic and Geometric Aspects of Integrable Systems. Part 3

9.2 Advances in Krylov subspaces, preconditioning and analysis

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

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

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

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

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

9.8 Recent developments in finite element methods. Part 2

9.9 Complex adaptive systems in Life and Social Sciences. Part 3

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33

34

35

36

37
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 (aaceves@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
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

**CHAIR**  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 (tttdang9@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

**CHAIR**  Frank Sottile

**17:00–17:30**  
Joe Kileel (j.kileel@math.utexas.edu)  
*University of Texas at Austin*  
“Recovering group orbits from polynomial invariants, and applications to cryo-EM”
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

CHAIRIED BY Bruce Wade

17:00–17:30 Zhaosheng Feng (zhaoosheng.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

CHAIRIED 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  
**CHAIR 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  
**CHAIR 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  
University of Texas at Austin
“Time-marching DPG scheme and error representation for transient problems.”

18:30–19:00  Sue Minkoff
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*
- **Anthony Stefan** (astefan2015@my.fit.edu), *Florida Institute of Technology*
- **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 (nosromdivad@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*
- **J. Maurice Rojas** (jmauricerojas@gmail.com), *Texas A&M University*
- **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.”
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

CHAIRRED 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

CHAIRRED 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
Recent advances in Image processing and Data Sciences

**LOCATION**  Spoonbill

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

**CHAIR**  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

**CHAIR**  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
  “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”
“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
CHAIR ED 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
CHAIR ED 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), Florida Institute of Technology

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

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

**CHAIRLED BY**  Anthony Stefan

13:00–13:30  Yuriy Grabovsky (yury@temple.edu)
Temple University
“Exact relations and links for two-dimensional thermoelectric composites”

13:30–14:00  Andrej Cherkaev (cherk@math.utah.edu)
University of Utah
“Some optimal multi-material composites”

14:00–14:30  Justin Baker (baker@math.utah.edu)
University of Utah
“Optimal Design in Monge-Kantorovich Transportation Problem”

14:30–15:00  Daniel Onofrei (dtonofre@central.uh.edu)
University of Houston
“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), 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

**CHAIRLED BY**  J. Maurice Rojas

13:00–13:30  Rupei Xu (rupei.xu@utdallas.edu)
The University of Texas at Dallas
“Beyond Linear Algebra and Euclidean Geometry in 5G and Beyond Networks”

13:30–14:00  Zeyu Guo (zguotcs@gmail.com)
The University of Texas Austin
“Variety Evasive Subspace Families”

14:00–14:30  Carlos E. Arreche (arreche@utdallas.edu)
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
CHAIREDBY 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_moire5@baylor.edu)
Baylor University
“Locally mass conservative partitioned numerical methods for poroelasiticy”

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
CHAIREDBY 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 (mlatifi@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
CHAIR ed 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 positivistellensatz 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
CHAIR ed 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),  University of Louisiana at Lafayette

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

**CHAIR**  Hana Dobrovolny

13:00–13:30  Hana Dobrovolny (h.dobrovolny@tcu.edu)
   Texas Christian University
   “Testing density-dependent infection rates for modeling of influenza”

13:30–14:00  Zhuolin Qu (zhuolin.qu@utsa.edu)
   University of Texas at San Antonio
   “Network modeling the impact of male-screening on the Chlamydia trachomatis prevalence in women”

14:00–14:30  Brian Pidgeon (bdpidgeon@gmail.com)
   Georgia State University
   “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)
   Texas Tech University
   “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),  Southern Methodist University

**ORGANIZED BY**  Haizhao Yang (yang1863@purdue.edu),  Purdue University

**ORGANIZED BY**  Senwei Liang (liang339@purdue.edu),  Purdue University

**CHAIR**  Wenjing Liao

13:00–13:30  Wenjing Liao (wliao60@gatech.edu)
   Georgia Institute of Technology
   “Nonparametric estimation of nonlinear operators between function spaces by deep neural networks”

13:30–14:00  Xiaoliang Wan (xlwan@lsu.edu)
   Louisiana State University
   “A deep adaptive sampling method for solving PDEs”

14:00–14:30  Tan Nguyen (tanmnguyen89@gmail.com)
   University of California, Los Angeles
   “Momentum-Based and Fast Multipole Methods for Designing Deep Learning Models”
Recent Advances in Model Order Reduction and Applications in Inverse Problems

**Location**  
Heron

**Organized by**  
Alexander Mamonov (mamonov@math.uh.edu), University of Houston

**Chair**  
Maxim Olshanskii

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

Vladimir Druskin (vdruskin@wpi.edu)  
Worcester Polytechnic Institute  
“Lippmann-Schwinger-Lanczos algorithm for inverse scattering problems”

13:48–14:12  
Jorn Zimmerling (zimmerl@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

CHAIRLED 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

CHAIRLED 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** (goldstein345@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

**CHAIR** 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 (etovar1@tamu.edu), Texas A&M University

**CHAIR** Bennett Clayton

16:30–17:00  **Tarik Dzanic** (tdzanic@tamu.edu)  
*Texas A&M University*
Dispersive Wave Equations with Applications in Optics and Fluids. Part 1

**LOCATION**  Seagull

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

**CHAIR**  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

**CHAIR**  Dmitriy Bilyk

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

CHAIRIED 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), Southern Methodist University
Chaired by: A.K. Barreiro, B. Stigler

08:00–08:30  Joaquin Gonzalez (joaquin@texascivilrightsproject.org)  
Texas Civil Rights Project  
"Where the Rubber Meets the Road: Introducing Political, Historical, and Legal Complexities into the Equation"

08:30–09:00  Scott Cook (scook@tarleton.edu)  
Tarleton State University  
"Improved Recombination MCMC with 2020 Census Results For Texas Redistricting"

09:00–09:30  Anne Egelston (egelston@tarleton.edu)  
Tarleton State University  
"Validating Mathematical Assumptions: A political science perspective"

09:30–10:00  Betseygail Rand (brand@tlu.edu)  
Will Hager (whager@tlu.edu)  
Texas Lutheran University  
"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), Southern Methodist University
Organized by: Brian Choi (choighmath@gmail.com), Southern Methodist University
Chaired by: Brian Choi

08:00–08:30  Michael Hott (michael.hott@math.utexas.edu)  
University of Texas at Austin  
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)  
The University of Texas at Austin  
"Dynamical Hartree–Fock–Bogoliubov approximation of interacting bosons "

27
### 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  
- Erwin Suazo (erwin.suazo@utrgv.edu), University of Texas Rio Grande Valley  
- Vesselin Vatchev (vesselin.vatchev@utrgv.edu), University of Texas Rio Grande Valley  
- W.A. Zuniga-Galindo (wilson.zunigagalindo@utrgv.edu), University of Texas Rio Grande Valley  
**Chaired by** Zhijun Qiao  

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<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Affiliation</th>
<th>Topic</th>
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<tbody>
<tr>
<td>08:00–08:30</td>
<td>Dambaru Bhatta</td>
<td>University of Texas Rio Grande Valley</td>
<td>“Convective flow analysis in solidification of binary alloys”</td>
</tr>
<tr>
<td>08:30–09:00</td>
<td>Yufeng Zhang</td>
<td>Beijing University of Technology</td>
<td>“Asymptotical stability of Riemann-Liouville fractional neutral systems with multiple discrete delays”</td>
</tr>
<tr>
<td>09:00–09:30</td>
<td>Shaotao Zhu</td>
<td>Beijing University of Technology</td>
<td>“Multiple periodic vibrations of auxetic honeycomb sandwich plates with 1:2 internal resonance”</td>
</tr>
</tbody>
</table>

### 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  

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Affiliation</th>
<th>Topic</th>
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<tbody>
<tr>
<td>08:00–08:30</td>
<td>Andrea Bonito</td>
<td>Texas A&amp;M University</td>
<td>“Numerical Approximations of Curved Origamis”</td>
</tr>
<tr>
<td>08:30–09:00</td>
<td>Maxim Olshanskii</td>
<td>University of Houston</td>
<td>“A finite element method for two-phase surface fluids and modeling of multicomponent lipid membranes”</td>
</tr>
<tr>
<td>09:00–09:30</td>
<td>Abner J. Salgado</td>
<td>University of Tennessee</td>
<td>“Analysis and approximation of fluids under singular forcing”</td>
</tr>
<tr>
<td>09:30–10:00</td>
<td>Alan Demlow</td>
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</tr>
</tbody>
</table>
Numerical methods for multi-phase flows in porous media

LOCATION SEAGULL

ORGANIZED BY Loic Cappanera (lmcappan@central.uh.edu), University of Houston

CHAIR ED BY Loic Cappanera

08:00–08:30 Maria Vasilyeva (maria.vasilyeva@tamucc.edu) 
Texas A&M University - Corpus Christi
“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) 
Rice University
“A discontinuous Galerkin method with bound-preserving limiters for two-phase immiscible flow”

09:00–09:30 Chenyu Tian (chenyu@ices.utexas.edu) 
Oden Institute, University of Texas at Austin
“Simulation of Multiphase Flow and Transport in Partially Melted Materials”

09:30–10:00 Giselle Sosa Jones (ggsosajo@central.uh.edu) 
University of Houston
“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), 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

CHAIR ED BY Jesse Chan

08:00–08:30 Eirik Valseth (eirik@utexas.edu) 
The University of Texas at Austin
“Goal-Oriented Error Estimation for the Shallow Water Equations”

08:30–09:00 Eric Tovar (ejtovar1@tamu.edu) 
Texas A&M University
“Well-balanced second-order convex limiting technique for solving the Serre 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**
Stephehn Anco (sanco@brockc.edu), Brock University, Canada

**Organized by**
Hamidreza Ramezani (hamidreza.ramezani@utrgv.edu), University of Texas Rio Grande Valley

**Chaired by**
Stephehn 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 Ghaemidizicheh (hamed.ghaemidizicheh@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 H1 and H(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
**CHAIRMED 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 (irodri68@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

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

CHAIED 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

CHAIED 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](mailto: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](mailto:maxim.olshanskii@gmail.com)), *University of Houston*

**CHAIRLED BY**  
**Alan Demlow**

10:15–10:45  **Alexander Zhiliakov** ([alex@math.uh.edu](mailto: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](mailto: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](mailto:rhan@lsu.edu)), *Louisiana State University*

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

**CHAIRLED BY**  
**Jake Fillman**

10:15–10:45  **Jonathan Stanfill** ([jonathan_stanfill@baylor.edu](mailto: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](mailto:szs0266@auburn.edu))  
*Auburn University*  
“Asymptotic perturbation theory for extensions of symmetric operators”

11:15–11:45  **Fan Yang** ([yangf@lsu.edu](mailto: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](mailto:cosmaskravaris@tamu.edu))  
*Texas A&M University*
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 **Loïc 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 Gkiouloukas (eleftherios.gkiouloukas@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 Gkiouloukas

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”
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

**CHAIR** 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
Complex adaptive systems in Life and Social Sciences. Part 3

**LOCATION**

**HERON**

**ORGANIZED BY**

- Lucero Rodriguez Rodriguez (lrodri68@asu.edu), Arizona State University
- Yun Kang (lun.kang@asu.edu), Arizona State University
- Jordy Cevallos-Chavez (jcevall1@asu.edu), Arizona State University

**CHAIGHED BY**

- Lucero Rodriguez Rodriguez
- 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”

- Tamer Oraby (tamer.oraby@utrgv.edu) The University of Texas Rio Grande Valley
  
  “Network modeling of Social Learning of Vaccination and Disease Spread”

- 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”

- 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”