Association for Women in Mathematics
Events at the 2022 SIAM Annual Meeting

Monday, July 11, 2022, 8.30am – 10.30am
MS3 – AWM Workshop: Graph Theory and Applications, Part I of II
Room 310/311, David L. Laurence Convention Center

Organizers
Katherine Benson, University of Wisconsin-Stout, Menomonie, WI
Daniela Ferrero, Texas State University, San Marcos, TX

Schedule
8:30 - 8:55 Comparing Product Throttling for Zero Forcing, Cops and Robbers, and Power Domination
Sarah Anderson, University of St. Thomas, St. Paul, MN

9:00 - 9:25 Symmetry Parameters for Mycielskian Graphs
Puck Rombach, University of Vermont, Burlington, VT

9:30 - 9:55 The Threshold Strong Dimension of a Graph
Shonda Dueck, University of Winnipeg, Manitoba, Canada

10:00 - 10:25 Inner Code Impact on Graph-Based Codes
Gretchen Matthews, Virginia Tech, Blacksburg, VA

Monday, July 11, 2022, 12.30pm – 2.00pm
AWM Workshop: Mentoring Lunch
An invited lunch for AWM Mentors and Graduate Student Workshop Participants

Monday, July 11, 2022, 2.45pm – 3.30pm
SP1 – AWM-SIAM Sonia Kovalevsky Lecture
Spirit of Pittsburgh A, David L. Laurence Convention Center

Two of my Favorite Problems
Anne Greenbaum, University of Washington, Seattle, WA

I will discuss two problems on which I have worked extensively and the many remaining open questions.
The first involves the Lanczos algorithm for constructing an orthonormal basis for the Krylov space corresponding to a Hermitian matrix $A$ and a given vector $b$. The vectors produced can be used to solve linear systems, compute eigenvalues/vectors, evaluate matrix functions $f(A)b$, etc. And while this algorithm is very widely used, it is, in the most intuitive sense, dramatically unstable. Behavior of the best implementations using the best computer arithmetic have been explained to some extent, but with implementations being developed for single and half precision and with computations being arranged to make better use of parallelism, etc., it is important to know what will and will not work.
The second has to do with nonsymmetric matrices and operators. It is known that eigenvalues alone provide no information about the behavior of Krylov space methods such as GMRES; the field of values, or, numerical range provides some information, but it is too large a set. I will discuss K-spectral sets and what they can tell us about the behavior of Krylov space methods and other problems in numerical analysis.
Monday, July 11, 2022, 4.00pm – 6.00pm

**MS15 – AWM Workshop: Graph Theory and Applications, Part II of II**

*Room 310/311, David L. Laurence Convention Center*

**Organizers**
- Katherine Benson, University of Wisconsin-Stout, Menomonie, WI
- Daniela Ferrero, Texas State University, San Marcos, TX

**Schedule**

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<tr>
<th>Time</th>
<th>Title</th>
<th>Presenter</th>
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<tr>
<td>4:00</td>
<td>Hamilton Paths in Domination Reconfiguration Graphs</td>
<td>Heather S. Blake, Davidson College, Davidson, NC</td>
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<tr>
<td>4:30</td>
<td>Many Cliques in Bounded-Degree Hypergraphs</td>
<td>Rachel Kirsch, George Mason University, Fairfax, VA</td>
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<tr>
<td>5:00</td>
<td>Graphs, Codes, and Compressed Sensing</td>
<td>Esmeralda L. Nastase, Xavier University, Cincinnati, OH</td>
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<tr>
<td>5:30</td>
<td>Interesting Open Problems in Saturation Theory</td>
<td>Jill Faudree, University of Alaska, Fairbanks, AK</td>
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Tuesday, July 12, 2022, 8.00pm – 10.00pm

**MP1 – AWM Workshop Graduate Student Poster Session and Reception**

*West Atrium - 3rd Floor*

**Chairs**
- Lorena Bociu, North Carolina State University, Raleigh, NC
- Daniela Ferrero, Texas State University, San Marcos, TX
- Suzanne Sindi, University of California, Merced, CA

**Poster Tiles and Presenters**

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<tr>
<th>Title</th>
<th>Presenter</th>
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<tr>
<td>Local Compatibility Boundary Conditions for High-Order Accurate Finite-Difference Approximations of PDEs</td>
<td>Nour G. Al Hassanieh, Rensselaer Polytechnic Institute, U.S.</td>
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<td>Periodicity of Mixed-Integer Programming Gap Functions</td>
<td>Rachael M. Alfant, Rice University, U.S.</td>
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<td>Dirac’s Theorem for Hamiltonian Berge Cycles in Uniform Hypergraphs</td>
<td>Grace McCourt, University of Illinois at Urbana-Champaign, U.S.</td>
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<td>Inferring Dynamics of Biological Systems</td>
<td>Tracey G. Oellerich, George Mason University, U.S.</td>
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<td>Dynamical Systems Modeling of Inflammation for a Continuous Administration of Endotoxin</td>
<td>Kristen Windoloski, North Carolina State University, U.S.</td>
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<tr>
<td>Champ: A High-Order Accurate Partitioned Scheme for Conjugate Heat Transfer</td>
<td>Sijia Huang, Rensselaer Polytechnic Institute, U.S.</td>
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<td>Kempe Equivalent List Colorings</td>
<td>Reem Mahmoud, Virginia Commonwealth University, U.S.</td>
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<td>Acyclic Graphs with at Least 2l + 1 Vertices are l-recognizable</td>
<td>Mina Nahvi, University of Illinois, U.S.</td>
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<td>Modeling and Tracking Biofilm-Mediated Bacteria within a Water Supply Network</td>
<td>Susan Rogowski, Florida State University, U.S.</td>
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<tr>
<td>Mathematical Analysis of Pulmonary Hypertension and Ventricular Interaction</td>
<td>Amanda L. Colunga, North Carolina State University, U.S.</td>
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Artificial Intelligence & Cryptography: Privacy and Security in the AI Era
Kristin Lauter, Facebook AI Research, Seattle, WA

How is Artificial Intelligence (AI) changing your life and the world? How can you expect your data to be kept secure and private in an AI-driven future?

AI is the science of machine learning, or the use of data and computation to build mathematical models capable of making predictions. AI may improve our lives, but without adequate safeguards, AI may also jeopardize the security of our private data.

This talk will explain Private AI and the dynamic relationship between cryptography and AI. Cryptography is the science of protecting the privacy and security of data. A new form of encryption – based on the mathematics of lattices – secures data while still enabling AI.

Organizers
Suzanne Sindi, University of California, Merced, CA
Suzanne M. Lenhart, University of Tennessee, Knoxville, TN
Ron Buckmire, Occidental College, Los Angeles, CA.

Schedule
8:30 - 8:55 Classroom Social Equity
Kelly MacArthur, University of Utah, Salt Lake City, UT
9:00 - 9:25 Postsecondary Education for Students with Disabilities in Stem
Overtoun Jenda, Auburn University, Auburn, AL
9:30 - 9:55 Best Practices for an Inclusive Active Learning Classroom
Victor Pierce, Ferris State University, Big Rapids, MI
10:00 - 10:25 Correlates of Student Success and Adaptive Learning: An Evidence-Based Approach to Exercise
Juan Gutierrez, University of Texas, San Antonio, TX

DNA Clusters and Viral Structures
Carme Calderer, University of Minnesota, Minneapolis, MN
9:00 - 9:25 The Preasymptotic Model for Prestrained Plates
Angelique Morvant, Texas A&M University, College Station, TX
9:30 - 9:55 A Symmetric Force-Based Blending Method for the Atomistic-to-Continuum Coupling
Xingjie Li, University of North Carolina, Charlotte, NC
10:00 - 10:25 Dynamics of Grain Boundaries in Polycrystals: Modeling, Analysis, Simulation and Experiments
Yekaterina Epshteyn, University of Utah, Salt Lake City, UT
Thursday, July 14, 2022, 4.00pm – 6.00pm

**MS106 – Women in the Mathematics of Materials: Recent Advances in Modeling and Numerical Methods, Part II of II**

**Room 320, David L. Laurence Convention Center**

**Organizers**

Malena Espanol, Arizona State University, Tempe, AZ  
Natasha S. Sharma, University of Texas, El Paso, TX

**Schedule**

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<th>Title</th>
<th>Speaker</th>
<th>Institution</th>
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<tr>
<td>4:00 - 4:25</td>
<td>Neural Network Based Asymptotic Preserving Scheme for Radiative Transport Equation</td>
<td>Li Wang</td>
<td>University of Minnesota, Minneapolis, MN</td>
<td>Room 320</td>
</tr>
<tr>
<td>4:30 - 4:55</td>
<td>A Continuum-Based Model of Lipid Domain Coarsening and Fluidity in Lipid Vesicles</td>
<td>Annalisa Quaini</td>
<td>University of Houston, Houston, TX</td>
<td>Room 320</td>
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<tr>
<td>5:00 - 5:25</td>
<td>Discrete-to-Continuum Modelling of Weakly Interacting Incommensurate Two-Dimensional Lattices</td>
<td>Malena Espanol</td>
<td>Arizona State University, Tempe, AZ</td>
<td>Room 320</td>
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<tr>
<td>5:30 - 5:55</td>
<td>Dimensional Reduction for the Ferroelectric SmA-type Phase in BCLC</td>
<td>Tiziana Giorgi</td>
<td>New Mexico State University, Las Cruces, NM</td>
<td>Room 320</td>
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Monday July 11 - Thursday, July 14, 2022, 9.30am – 4.30pm

**AWM Booth**

**Exhibit Hall, David L. Laurence Convention Center**

Please consider volunteering to staff the AWM booth for a 2 hour block. This is a great opportunity to meet other women in math, as well as learn (and share!) more about the many opportunities within AWM. If you are interested, please sign up for a time slot on this [Google Form](#)

**AWM - SIAM Committee**

- **Selenne Bañuelos**, IPAM (Institute for Pure and Applied Mathematics), Los Angeles, CA  
- **Katherine Benson**, University of Wisconsin-Stout, Menomonie, WI  
- **Lorena Bociu**, North Carolina State University, Raleigh, NC  
- **Daniela Ferrero**, Texas State University, San Marcos, TX  
- **Mary Ann Horn**, Case Western Reserve University, Cleveland, OH  
- **Malgorzata Peszynska**, Oregon State University, Corvallis, OR  
- **Chrysoula Tsogka**, University of California, Merced, CA

**Special Thanks**

- **Malena Espanol**, Arizona State University, Tempe, AZ  
- **Samantha Faria**, AWM  
- **Darla Kremer**, AWM  
- **Suzanne Sindi**, University of California, Merced, CA