

# Association for Women in Mathematics



## **AWM Research Symposium 2015**

**April 11-12, 2015**

at

**University of Maryland, College Park**

College Park, MD

### **Organizers**

Ruth Charney (Brandeis University)

Shelly Harvey (Rice University)

Kristin Lauter (Microsoft Research)

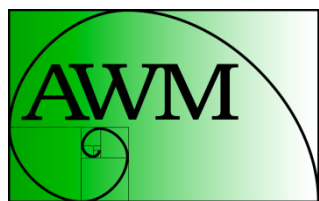
Gail Letzter (National Security Agency)

Magnhild Lien (California State University, Northridge)

Konstantina Trivisa (University of Maryland)

Talitha Washington (Howard University)





ASSOCIATION FOR  
WOMEN IN MATHEMATICS

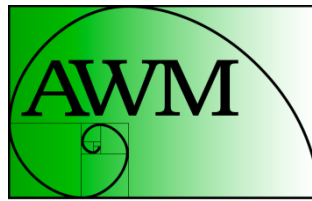
## 2015 AWM Research Symposium Sponsors



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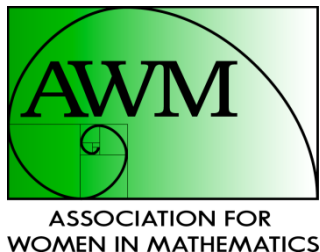
**WOLFRAM**



ASSOCIATION FOR  
WOMEN IN MATHEMATICS

## 2015 AWM Research Symposium Exhibitors





April 11, 2015

Dear Colleagues,

It is our great pleasure to welcome you to AWM Research Symposium 2015 on the campus of the University of Maryland, College Park. This research conference highlights the accomplishments of women in mathematics and showcases the research of female mathematicians at all stages of their careers. We are grateful to the University of Maryland for hosting this symposium and to our sponsors and exhibitors Microsoft Research, NSF, NSA, NIST, Springer, Elsevier, Google, Wolfram and INTECH for their generous support.

In 2011, the Association for Women in Mathematics celebrated its fortieth anniversary with a research conference, *"40 Years and Counting, AWM's Celebration of Women in Mathematics."* Participation at the anniversary conference greatly exceeded all expectations and motivated AWM to launch a series of biennial research symposia. The second AWM Symposium was held at Santa Clara University in 2013, and this symposium is the third event in the series. These symposia are designed to help support and nurture networks of female researchers in many areas of mathematics, to provide networking opportunities for junior and senior women to enhance career prospects and recognition.

AWM was founded in 1971 during a period when relatively few women in the U.S. earned a Ph.D. in mathematics, and jobs for women were scarce. A number of positive changes have taken place since then. AWM has been a force for change and an effective voice in support of the advancement of women in the profession. AWM supports many programs aimed at junior researchers to encourage young women to study mathematics and have careers in the mathematical sciences. AWM prizes and named lectureships highlight outstanding work by women mathematicians. AWM conferences and publications build community among female researchers in focused areas of mathematics.

Thank you for your support of AWM over the years and for helping to shape the AWM community. If you are not currently an AWM member, we hope you will join the organization and help us continue AWM's rich tradition.

Welcome!

Ruth, Shelly, Kristin, Gail, Magnhild, Konstantina, Talitha



# AWM Research Symposium 2015

## Schedule

<b>Saturday, April 11, 2015</b>	
8:00 - 8:30	Registration and Continental Breakfast, Math Building, Rotunda
8:30 - 8:45	<b>Welcome:</b> Kristin Lauter, AWM President, and Ruth Charney, AWM Past-President Physics Building, 1412
8:45 - 9:30	<b>Plenary Lecture:</b> Ingrid Daubechies, Duke University Applied Mathematics Helping Art Historians and Conservators: Digital Cradle Removal, Physics Building, 1412
9:30 - 10:15	<b>Poster Session I</b> , Exhibits, and Coffee, Math Building, Rotunda (see page 3)
10:15 - 12:15	<b>Special Sessions</b> , Math Building (see pages 4 – 7) Many facets of Probability, Room 0401 Symplectic Topology/Geometry, Room 0403 PDEs in Continuum Mechanics, Room 0405 Sharing the Joy: Engaging Undergraduate Students in Mathematics, Room 0409 Mathematics at Government Labs and Centers, Room 1313 Topics in Computational Topology and Geometry, Room 0302 Recent mathematical advancements empowering signal/image processing, 0407 Algebraic Geometry, Room 1308 Number Theory, Room 1311
12:15 - 1:45	<b>Lunch Break</b> (on your own)
1:00 - 1:45	<b>LBQT Tea</b> (all are invited), Math Building, Math Department Lounge, 2 <sup>nd</sup> Floor
1:15 – 1:40	<b>Philip Whitman, INTECH - Stock Market Stability</b> Math Building, Room 1311
1:45 - 3:45	<b>Special Sessions</b> , Math Building (see pages 7 – 10) Many facets of Probability, Room 0401 Symplectic Topology/Geometry, Room 0403 PDEs in Continuum Mechanics, Room 0405 Mathematical Biology, Room 0407 Mathematics at Government Labs and Centers, Room 1313 Research from the "Cutting EDGE," Room 1311 Discrete Math, Room 0302 Low-dimensional Topology, Room 0409 Statistics, Room 1308
3:45 - 4:30	<b>Poster Session II</b> , Exhibits, and Coffee, Math Building, Rotunda (see pages 10 - 11)
4:30 – 4:35	<b>Announcements:</b> Magnhild Lien, AWM Executive Director
4:35 - 5:20	<b>Plenary Lecture:</b> Maria Chudnovsky, Columbia University Coloring square-free perfect graphs Physics Building, 1412

5:30 - 7:00	<b>Reception and Jobs Panel</b> (6:15 pm), College Park Marriott Hotel and Conference Center, Potomac Ballroom (see pages 17 – 18) Panel: Math Research in Government and Industry Moderator: Gail Letzter, U.S. Department of Defense Panelists: Gagan Aggarwal, Google Research Lily Chen, National Institute of Standards and Technology Michelle Dunn, National Institutes of Health Deborah Lockhart, National Science Foundation Adele Merritt, National Security Agency Philip Whitman, INTECH
7:00 - 9:30	<b>Banquet</b> , College Park Marriott Hotel and Conference Center, Potomac Ballroom
<b>Sunday, April 12, 2015</b>	
8:00 - 8:30	<b>Registration and Continental Breakfast</b> , Math Building, Rotunda
8:30 – 9:15	<b>Plenary Lecture:</b> Jill Pipher, Brown University Dyadic Analysis: From Fourier to Haar to Wavelets, and back Physics Building, 1412
9:15 - 9:30	<b>Coffee</b> , Math Building, Rotunda
9:30 - 11:30	<b>Special Sessions</b> , Math Building (see pages 11 - 14) Topics in Computational Topology and Geometry, Room 0306 Recent mathematical advancements empowering signal/image processing, 1313 Algebraic Geometry, Room 1308 Number Theory, Room 0307 Sharing the Joy: Engaging Undergraduate Students in Mathematics, Room 0403 Research from the "Cutting EDGE," Room 1311 Discrete Math, Room 0401 Low-dimensional Topology, Room 0409 Statistics, Room 0405 Mathematical Biology, Room 0407
11:45 - 12:30	<b>Plenary Lecture:</b> Katrin Wehrheim, University of California Berkeley String diagrams in Topology, Geometry, and Analysis Physics Building, 1412



**Saturday Morning, April 11, 2015, 8:45 – 9:30**

**Plenary Lecture: Ingrid Daubuchies**, Duke University

*Applied Mathematics Helping Art Historians and Conservators: Digital Cradle Removal*

Introduced by Konstantina Trivisa

Physics Building, 1412

**Saturday Morning, April 11, 2015, 9:30 – 10:15**

**Coffee Break and Poster Session I**, Math Building Rotunda

Abstracts can be found on [www.awm-math.org](http://www.awm-math.org)



Sita Benedict, University of Jyväskylä

Hardy-Orlicz Spaces of Conformal Densities on  $B^n$

Racheal L. Cooper, Virginia Commonwealth University

A Mathematical Model of Drug Treatments Used To Promote Successful Hematopoietic Stem Cell Transplants In Lymphoma Patients.

Rachel Davis, Purdue University

Origami and Galois Representations

Jessica Fintzen, Harvard University

Stable Vectors in the Moy-Prasad Filtration

Amanda Francis, Brigham Young University

FJRW Theory for Various Polynomial Representatives of Parabolic Singularities

Joanna Furno, Wesleyan University

A Comparison of Two Families of Fourth-Degree Rational Maps

Rachel Grotheer, Clemson University

Solution Methods for the Forward and Inverse Problems of Hyperspectral Diffuse Optical Tomography

Anna R. Haensch, Duquesne University

Neighboring Graphs and the Kneser-Hecke-operator for Quaternary Codes

Mee Seong Im, University of Illinois

On Quiver Hecke, Quantum Shuffle, and Quantum Cluster Characters

Fiona M. Knoll, Clemson University

Johnson-Lindenstrauss Projection of High Dimensional Data

**Saturday Morning, April 11, 2015, 10:15 – 12:15**

Abstracts can be found on [www.awm-math.org](http://www.awm-math.org)



**Special Session: Many facets of Probability**

Organizers: Sandra Cerrai, Elena Kosygina

*Many facets of Probability I*

*Saturday, April 11, Math Building, Room 0401*

10:15-10:35 Hakima Bessaih, University of Wyoming

On the rate of convergence of the 2-D stochastic Leray alpha model with multiplicative noise

10:45-11:05 Raluca Balan, University of Ottawa

Intermittency for the stochastic wave and heat equations with fractional noise in time

11:15-11:35 Hao Wu, MIT

Conformal Restriction: the chordal and the radial

11:45-12:05 Ioana Dumitriu, University of Washington

A regular binary Stochastic Block Model

**Special Session: Symplectic Topology/Geometry**

Organizers: Katrin Wehrheim

*Symplectic Topology/Geometry I*

*Saturday, April 11, Math Building, Room 0403*

10:15-10:35 Lisa Traynor, Bryn Mawr College

Non-Orientable Lagrangian Endocobordisms

10:45-11:05 Laura Starkston, University of Texas, Austin

Symplectic fillings

11:15-11:35 Ailsa Keating, Columbia University

Symplectic properties of positive modality Milnor fibres

11:45-12:05 Joanna Nelson, IAS and Barnard College at Columbia University

Cylindrical Contact Homology: An Abridged Retrospective

**Special Session: PDEs in Continuum Mechanics**

Organizers: Anna Mazzucato, Maria Gualdani

*PDEs in Continuum Mechanics I*

*Saturday, April 11, Math Building, Room 0405*

10:15-10:35 Juhi Jang, University of California Riverside

Passive scalars, moving boundaries, and Newton's law of cooling

10:45-11:05 Maria Emelianenko, George Mason University

PDE-based modeling of coarsening in polycrystalline materials

11:15-11:35 Evelyn Lunasin, United States Naval Academy

Finite determining parameters feedback control for distributed nonlinear dissipative systems: a computational study

11:45-12:05 Miao-Jung Yvonne Ou, University of Delaware  
On reconstruction of the dynamic tortuosity functions of poroelastic materials

**Special Session: Sharing the Joy: Engaging Undergraduate Students in Mathematics**

Organizers: Julie Barnes, Jo Ellis-Monaghan, Maura Mast

*Sharing the Joy: Engaging Undergraduate Students in Mathematics I*

*Saturday, April 11, Math Building, Room 0409*

10:15-10:35 Connie Campbell, Millsaps College  
Helping Students in a Proofs Course Develop Metacognitive Skills

10:45-11:05 Brigitte Servatius, Worcester Polytechnic Institute  
What is a good question?

11:15-11:35 Barbara Shipman, University of Texas at Arlington  
Teaching from the Heart of Mathematical Thought

11:45-12:05 Jessica Libertini, Virginia Military Institute  
Using Applications to Motivate Differential Equations

**Special Session: Mathematics at Government Labs and Centers**

Organizers: Gail Letzter, Carla Martin

*Mathematics at Government Labs and Centers I*

*Saturday, April 11, Math Building, Room 1313*

10:15-10:35 Cynthia Phillips, Sandia National Laboratories  
Cooperative Computing for Autonomous Data Centers

10:45-11:05 Carol S. Woodward, Lawrence Livermore National Laboratory  
Nonlinear Solvers for Dislocation Dynamics

11:15-11:35 Zichao (Wendy) Di, Argonne National Laboratory  
Optimization Approach for Tomographic Inversion from Multiple Data Modalities

11:45-12:05 Genevieve Brown, Department of Defense  
A New Basis for Graph and Tensor Partitioning: Standardizing the Interactions  
Matrix/Tensor

**Special Session: Topics in Computational Topology and Geometry**

Organizers: Erin Chambers, Elizabeth Munch

*Topics in Computational Topology and Geometry I*

*Saturday, April 11, Math Building, Room 0302*

10:15-10:35 Anthea Monod, Duke University  
Statistical Estimation of Random Field Thresholds Using Euler Characteristics

10:45-11:05 Brittany Terese Fasy, Tulane University  
Using Statistics in Topological Data Analysis

11:15-11:35 Sara Kalisnik, Stanford University  
Parametrized homology & Parametrized Alexander Duality Theorem

11:45-12:05 Yusu Wang, Ohio State University  
Comparing Graphs via Persistence Distortion

**Special Session: Recent mathematical advancements empowering signal/image processing**

Organizers: Julia Dobrosotskaya, Weihong Guo

*Recent mathematical advancements empowering signal/image processing I*

*Saturday, April 11, Math Building, Room 0407*

10:15-10:35 Stacey Levine, Duquesne University  
Denoising an Image by Denoising its Curvature

10:45-11:05 Viktoria Taroudaki, University of Maryland  
New spectral filters for a statistical approximation of corrupted images

11:15-11:35 Julian Chung, Virginia Tech  
An Iterative Algorithm for Large-scale Tikhonov Regularization

11:45-12:05 Xuemei Chen, University of Missouri, Columbia  
Row action methods and its relation to potential theory

**Special Session: Algebraic Geometry**

Organizers: Angela Gibney, Linda Chen

*Algebraic Geometry I*

*Saturday, April 11, Math Building, Room 1308*

10:15-10:35 Elizabeth Milićević, Haverford College  
Orbits in Affine Flag Varieties

10:45-11:05 Angela Cueto, Columbia University  
Repairing tropical curves by means of linear tropical modifications

11:15-11:35 Anna Kazanova, University of Georgia  
A family of type A conformal block bundles of rank one on  $M_{0,n}$

11:45-12:05 Julie Rana, Marlboro College  
The Craighero-Gattazzo surface is simply-connected

**Special Session: Number Theory**

Organizers: Wei Ho, Matilde Lalin, Jenny Fuselier

*Number Theory I*

*Saturday, April 11, Math Building, Room 1311*

10:15-10:35 Amanda Folsom, Amherst College  
Quantum modular and mock modular forms

10:45-11:05 Brooke Feigon, CUNY - The City College of New York  
Explicit construction of Ramanujan bigraphs

11:15-11:35 Charlotte Chan, University of Michigan  
p-adic Deligne-Lusztig constructions and the local Langlands correspondence

11:45-12:05 Maria Sabitova, CUNY-Queens College  
Root numbers of hyperelliptic curves

**12:15 - 1:45 Lunch Break (on your own)**

**1:00 - 1:45 LBQT Tea (all are invited),** Math Building, Math Department Lounge, 2nd Floor

**1:15 – 1:40 Philip Whitman, INTECH - Stock Market Stability,** Math Building, Room 1311

**Saturday Afternoon, April 11, 2015, 1:45 – 3:45**

Abstracts can be found on [www.awm-math.org](http://www.awm-math.org)



**Special Session: Many facets of Probability**

Organizers: Sandra Cerrai, Elena Kosygina

*Many facets of Probability II*

*Saturday, April 11, Math Building, Room 0401*

1:45-2:05 Tai Melcher, University of Virginia  
Hypoellipticity in infinite dimensions

2:15-2:35 Elena Kosygina, Baruch College and the CUNY Graduate Center  
Excited random walks in random cookie environments

2:45-3:05 Nevena Maric, University of Missouri, St. Louis  
Construction of multivariate distributions with given marginals and correlation

3:15-3:35 Kavita Ramanan, Brown University  
Large deviation principles for random projections of  $L^p$  balls and the atypicality of  
Cramer's theorem

**Special Session: Symplectic Topology/Geometry**

Organizers: Katrin Wehrheim

*Symplectic Topology/Geometry II*

*Saturday, April 11, Math Building, Room 0403*

1:45-2:05 Dusa McDuff, Barnard College at Columbia University  
Constructing Symplectic Embeddings

2:15-2:35 Ana Rita Pires, Fordham University  
The topology of toric origami manifolds

2:45-3:05 Olguta Buse, Indiana University-Purdue University Indianapolis  
Packing stability for symplectic four manifolds

3:15-3:35 Sue Tolman, University of Illinois at Urbana-Champaign  
Non-Hamiltonian actions with isolated fixed points

**Special Session: PDEs in Continuum Mechanics**

Organizers: Anna Mazzucato, Maria Gualdani

*PDEs in Continuum Mechanics II*

*Saturday, April 11, Math Building, Room 0405*

- 1:45-2:05 Svetlana Roudenko, George Washington University  
Behavior of solutions in the focusing nonlinear Schrodinger equation
- 2:15-2:35 Daniela De Silva, Barnard College, Columbia University  
Higher regularity boundary Harnack inequalities
- 2:45-3:05 Helen Nussenzveig Lopes, Federal University Rio de Janeiro  
Convergence of the 2D Euler-alpha model to the Euler equations in the no-slip case:  
indifference to boundary layers

**Special Session: Mathematical Biology**

Organizers: Erika Camacho, Talitha Washington

*Mathematical Biology I*

*Saturday, April 11, Math Building, Room 0407*

- 1:45-2:05 Mayteé Cruz-Aponte, Física Universidad de Puerto Rico en Cayey  
Mitigating effects of vaccination on influenza outbreaks given constraints in stockpile size  
and daily administration capacity
- 2:15-2:35 Evelyn Thomas, University of Maryland  
An Examination of Social Migration within a Cholera Outbreak
- 2:45-3:05 Faina Berezovskaya, Howard University  
Model of Tumor-Immune Cells Competing for Glucose Resource
- 3:15-3:35 Najat Ziyadi, Morgan State University  
A mathematical model of Nutrients-Phytoplankton-Oysters in a bay ecosystem

**Special Session: Mathematics at Government Labs and Centers**

Organizers: Gail Letzter, Carla Martin

*Mathematics at Government Labs and Centers II*

*Saturday, April 11, Math Building, Room 1313*

- 1:45-2:05 Kary Myers, Los Alamos National Laboratory  
An In Situ Approach for Approximating Complex Computer Simulations and Identifying  
Important Time Steps
- 2:15-2:35 Lily Chen, National Institute of Standards and Technology  
Feasibility and Infeasibility - Hard problems for cryptography
- 2:45-3:05 Karen Devine, Sandia National Laboratories  
Distributing linear systems for parallel computation
- 3:15-3:35 Yihua Zheng, NASA Goddard Space Flight Center  
The sun and space weather

**Special Session: Research from the "Cutting EDGE"**

Organizers: Ami Radunskaya, Kathleen Ryan

*Research from the "Cutting EDGE" I*

*Saturday, April 11, Math Building, Room 1311*

1:45-2:05 Amy Buchmann, University of Notre Dame

Flow Induced by Bacterial Carpets and Transport of Microscale Loads

2:15-2:35 Erica Graham, North Carolina State University

Mathematics, Insulin, and Reproductive Steroids: Understanding Why the Ovaries Suffer from Goldilocks Syndrome

2:45-3:05 Ellen Swanson, Centre College

Surfactant Spreading on a Thin Non-Newtonian Fluid

3:15-3:35 Candice Price, United States Military Academy West Point

Application of Knot Theory

**Special Session: Discrete Math (and Theoretical Computer Science)**

Organizers: Blair Sullivan

*Discrete Math (and Theoretical Computer Science) I*

*Saturday, April 11, Math Building, Room 0302*

1:45-2:05 Julia Chuzhoy, Toyota Technological Institute at Chicago

Grid Minor Theorem and Routing in Graphs

2:15-2:35 Dorit S. Hochbaum, University of California, Berkley

Combinatorial algorithms for the Markov Random Fields problem and implications for ranking, clustering, group decision making and image segmentation

2:45-3:05 Barna Saha, University of Massachusetts, Amherst

The Language Edit Distance Problem

3:15-3:35 Sofya Raskhodnikova, Pennsylvania State University

Differentially Private Analysis of Graphs and Social Networks

**Special Session: Low-dimensional Topology**

Organizers: Elisenda Grigsby, Shelly Harvey

*Low-dimensional Topology I*

*Saturday, April 11, Math Building, Room 0409*

1:45-2:05 Keiko Kawamuro, University of Iowa

Applications of open book foliations

2:15-2:35 Diana Hubbard, Boston College

Sutured Khovanov Homology of Braids and the Burau Representation

2:45-3:05 Caitlin Levenson, Duke University

Legendrian knots, augmentations, and rulings

3:15-3:35 Danielle O'Donnol, Oklahoma State University

Invariants and Legendrian Graphs

**Special Session: Statistics**

Organizers: Nancy Flourney, Mary Gray

**Statistics I**

Saturday, April 11, Math Building, Room 1308

1:45-2:05 Jie Chen, Medical College of Georgia

Statistical Change Point Analysis and its Application in Modeling the Next Generation Sequencing Data

2:15-2:35 Hongyuan Cao, University of Missouri-Columbia

Change point estimation: another look at multiple testing problems

2:45-3:05 Jing Qiu, University of Missouri

False discovery rate control of high dimensional TOST tests

3:15-3:35 Ke Wang, Pfizer

Applying Statistical Methods to Pfizer New Medicine Process and Product Development

**Saturday Afternoon, April 11, 2015, 3:45 – 4:30****Coffee Break and Poster Session II, Math Building Rotunda**

Abstracts can be found on [www.awm-math.org](http://www.awm-math.org)



Yasanthi Kottegoda, University of New Haven

The Zeros of Linear Recurring Sequences over Finite Fields

Ariana Minot, Harvard University

A Fully Distributed State Estimation Using Matrix Splitting Methods

Yumeng Ou, Brown University

Recent Developments in Multi-Parameter Singular Integral Operators

Arunima Ray, Brandeis University

Satellite Operators as Group Actions on Knot Concordance

Beth Romano, Boston College

Representations of  $p$ -adic Groups via Geometric Invariant Theory

Minghao Wu Rostami, Worcester Polytechnic Institute

Simulation of Fluid-Structure Interactions Modeled by Regularized Stokes Formulation Using Fast Multipole Method

Katherine Vance, Rice University

Tau Invariants for Balanced Spatial Graphs

Chong Wang, George Washington University

The Existence of a Core Shell Pattern for a Ternary Inhibitory



Anastasia Wilson, Clemson University  
Protein Adsorption in Porous Membranes

Karamatou Yacoubou Djima, University of Maryland  
Detection of Drusen in Human Retina using Laplacian Eigenmaps and Vectorized Matched Filtering

**Saturday Afternoon, April 11, 2015, 4:35 – 5:20**

**Plenary Lecture: Maria Chudnovsky**, Columbia University

*Coloring Square-free Perfect Graphs*

Introduced by Gail Letzter

Physics Building, 1412

**Sunday Morning, April 12, 2015, 8:30 – 9:15**

**Plenary Lecture: Jill Pipher**, Brown University

*Dyadic Analysis: From Fourier to Haar to Wavelets, and Back*

Introduced by Talitha Washington

Physics Building, 1412

**Sunday Morning, April 12, 2015, 9:30 – 11:30**

Abstracts can be found on [www.awm-math.org](http://www.awm-math.org)



**Special Session: Topics in Computational Topology and Geometry**

Organizers: Erin Chambers, Elizabeth Munch

*Topics in Computational Topology and Geometry II*

*Sunday, April 12, Math Building, Room 0306*

9:30-9:50 Vida Dujmovic, University of Ottawa

Layered Separators with applications

10:00-10:20 Katharine Turner, University of Chicago

PCA of persistent homology rank functions with case studies in point processes, colloids and sphere packings

10:30-10:50 Megan Owen, Lehman College, CUNY

Multiple Principal Components Analysis in Tree Space

11:00-11:20 Radmila Sazdanović, North Carolina State University

Categorification in applied topology

**Special Session: Recent mathematical advancements empowering signal/image processing**

Organizers: Julia Dobrosotskaya, Weihong Guo

*Recent mathematical advancements empowering signal/image processing II*

*Sunday, April 12, Math Building, Room 1313*

- 9:30-9:50 Julia Dobrosotskaya, Case Western Reserve University  
A PDE-free variational model for multiphase image segmentation
- 10:00-10:20 Ekaterina Merkurjev, University of California, Los Angeles  
An MBO Scheme on Graphs for Classification and Image Processing
- 10:30-10:50 Yifei Lou, University of Texas, Dallas  
A Weighted Difference of Anisotropic and Isotropic Total Variation Model for Image Processing
- 11:00-11:20 Jing Qin, University of California, Los Angeles  
Detecting Plumes in LWIR Using Robust Nonnegative Matrix Factorization Method

**Special Session: Algebraic Geometry**

Organizers: Angela Gibney, Linda Chen

*Algebraic Geometry II*

*Sunday, April 12, Math Building, Room 1308*

- 9:30-9:50 Yu-Jong Tzeng, University of Minnesota  
Motivic Gottsche's curve-counting invariants
- 10:00-10:20 Julia Hartmann, University of Pennsylvania  
Quadrics over Function Fields
- 10:30-10:50 Giulia Sacca, SUNY Stony Brook  
Geometry of moduli spaces of sheaves on a surface
- 11:00-11:20 Emily Clader, Institute for Theoretical Studies ETH  
The double ramification cycle and tautological relations

**Special Session: Number Theory**

Organizers: Wei Ho, Matilde Lalin, Jenny Fuselier

*Number Theory II*

*Sunday, April 12, Math Building, Room 0307*

- 9:30-9:50 Carrie Finch, Washington and Lee University  
Sierpinski and Riesel Numbers in Sequences
- 10:00-10:20 Lillian Pierce, Duke University  
Class numbers of quadratic number fields: a few highlights on the timeline from Gauss to today
- 10:30-10:50 Alison Miller, Harvard University  
Counting Simple Knots via Arithmetic Invariant theory
- 11:00-11:20 Adriana Salerno, Bates College  
Multiple zeta values: A combinatorial approach to structure

**Special Session: Research from the "Cutting EDGE"**

Organizers: Ami Radunskaya, Kathleen Ryan

*Research from the "Cutting EDGE" II*

*Sunday, April 12, Math Building, Room 1311*

- 9:30-9:50 Kathleen Ryan, DeSales University  
Degree Sequences of Graphs and Subgraphs of Specified Families
- 10:00-10:20 Sarah Bryant, Shippensburg University  
Subordinate Killed Brownian Motion
- 10:30-10:50 Raegan Higgins, Texas Tech University  
Oscillation of Certain Dynamic Equations on Time Scales
- 11:00-11:20 Carmen Wright, Jackson State University  
On the structure of the generalized symmetric space for  $-SL(3, q)$  with its inner involution

**Special Session: Discrete Math (and Theoretical Computer Science)**

Organizers: Blair Sullivan

*Discrete Math (and Theoretical Computer Science) II*

*Sunday, April 12, Math Building, Room 0401*

- 9:30-9:50 Emilie Hogan, Pacific Northwest National Laboratory  
Graph theoretical approaches in cyber security
- 10:00-10:20 Heather Smith, University of South Carolina  
Sampling Single Cut-or-Join Scenarios
- 10:30-10:50 Gagan Aggarwal, Google  
General auction mechanism for online advertising
- 11:00-11:20 Blair Sullivan, North Carolina State University  
Searching for Structure in Network Science

**Special Session: Low-dimensional Topology**

Organizers: Elisenda Grigsby, Shelly Harvey

*Low-dimensional Topology II*

*Sunday, April 12, Math Building, Room 0409*

- 9:30-9:50 Jen Hom, Columbia University  
Surgery obstructions and Heegaard Floer homology
- 10:00-10:20 Allison Moore, Rice University  
Heegaard Floer techniques and cosmetic crossing changes
- 10:30-10:50 Corrin Clarkson, Indiana University  
Three manifold mutations and Heegaard Floer homology
- 11:00-11:20 Margaret Doig, Syracuse University  
TBA

**Special Session: Statistics**

Organizers: Nancy Flournoy, Mary Gray

*Statistics II*

*Sunday, April 12, Math Building, Room 0405*

9:30-9:50 Shirin Golchi, Columbia University  
Sequentially Constraint Monte Carlo

10:00-10:20 Jennifer Le-Rademacher, Medical College of Wisconsin, Milwaukee  
A Symbolic Data Approach to Estimating Center Characteristics Effects on Outcomes

10:30-10:50 Erin R. Leatherman, West Virginia University  
Designing Combined Traditional and Simulator Experiments

11:00-11:20 DoHwan Park, University of Maryland - Baltimore County  
Empirical Null using Mixture Distributions and Its Application in Local False Discovery Rate

**Special Session: Sharing the Joy: Engaging Undergraduate Students in Mathematics**

Organizers: Julie Barnes, Jo Ellis-Monaghan, Maura Mast

*Sharing the Joy: Engaging Undergraduate Students in Mathematics II*

*Sunday, April 12, Math Building, Room 0403*

9:30-9:50 Audrey Malagon, Virginia Wesleyan University  
Keychain Ziplines: An engaging introduction to velocity in the calculus classroom

10:00-10:20 Julia Barnes, Western Carolina University  
Using feather boas, Wikki Stix®, or pipe cleaners to aid in student understanding of functions at all levels of the undergraduate mathematics curriculum.

10:30-10:50 Beth Schaubroeck, United States Air Force Academy  
Is It Time to Revitalize Your Subject? A Case Study from Complex Analysis

11:00-11:20 Annalisa Crannell, Gülce Tuncer, Franklin and Marshall College  
When the Taught becomes the Teacher

**Special Session: Mathematical Biology**

Organizers: Erika Camacho, Talitha Washington

*Mathematical Biology II*

*Sunday, April 12, Math Building, Room 0407*

9:30-9:50 Shari Wiley, University of Pennsylvania  
The effects of alcohol availability on contagious violence: a mathematical modeling approach

10:00-10:20 Anca Radulescu, SUNY New Paltz  
Dynamic networks: from connectivity to temporal behavior

10:30-10:50 Jing Li, California State University Northridge  
A Mathematical Model for Biocontrol of the Invasive Weed Fallopia Japonica

11:00-11:20 Kathleen A. Hoffman, University of Maryland Baltimore County  
An Integrative Approach to Lamprey Locomotion

**Sunday, April 12, 2015, 11:45 – 12:30**

**Plenary Lecture: Katrin Wehrheim**, University of California, Berkeley

*String diagrams in Topology, Geometry, and Analysis*

Introduced by Shelly Harvey, Physics Building, 1412

**Association for Women in Mathematics  
Networking Reception, Jobs Panel and Banquet  
College Park Marriott Hotel & Conference Center  
Potomac Ballroom  
Saturday, April 11, 2015**

5:30 pm – 7:00 pm: Networking Reception (cash bar)

6:00 pm – 7:00 pm: Panel: Math Research in Government and Industry

Moderator: Gail Letzter, U.S. Department of Defense

Panelists (see pages 16-17):

Gagan Aggarwal, Google Research

Lily Chen, National Institute of Standards and Technology

Michelle Dunn, National Institutes of Health

Deborah Lockhart, National Science Foundation

Adele Merritt, National Security Agency

Philip Whitman, INTECH

7:00 pm: Dinner Service

8:15 pm: Keynote, Shirley Malcom, AAAS (see page 18)

Introduction: Talitha Washington

AWM Presidential Awards, presented by Kristin Lauter and Ruth Charney  
Sylvia T. Bozeman and Rhonda Hughes

In Memoriam of Lee Lorch, Mary Gray

Closing Remarks, Kristin Lauter

## **Panel: Math Research in Government and Industry Biographies**

### **Gagan Aggarwal, Ph.D**

Google Research  
Research Scientist

Gagan Aggarwal is a research scientist in the Algorithms group at Google Research in Mountain View, CA. She received her PhD in Computer Science from Stanford University in 2005, and her B.Tech. in Computer Science and Engineering from IIT Delhi. Her research interests include approximation algorithms, combinatorial optimization and mechanism design. She joined Google Research in 2005 and has since worked on algorithm and auction design problems related to ads, stream ranking and switch topology.

### **Lily Chen, Ph.D.**

National Institute of Standards and Technology

Dr. Lily Chen is a mathematician and the acting group manager of Cryptographic Technology Group in Computer Security Division, Information Technology Laboratory, NIST.

Dr. Chen received her Ph.D in applied mathematics from Aarhus University, Denmark in 1994. Before joining NIST, she has worked in academic to teach mathematics and conduct cryptography research and then obtained experience in security technology practice in industry. Her research areas include cryptographic protocols, zero-knowledge proof, special featured digital signature schemes, network security, and security for wireless and mobility applications.

Besides authoring research papers, Dr. Chen has edited and actively contributed to various industry standards. In her professional communities, she served as an associate editor of IEEE Communications Letters and program committee members for numerous conferences in cryptography and security. She was also invited to speak at academia conferences, workshops, and industry forums. Her co-authored book "Communication System Security" was published in 2012 by CRC Press, Taylor & Francis Group.

### **Michelle Dunn, Ph.D.**

National Institutes of Health  
Senior Advisor for Data Science Training, Diversity, and Outreach,  
Office of the Associate Director for Data Science (ADDS)

In the ADDS Office, Dr. Dunn's responsibilities focus on education, training, and workforce development in data science, as it is applied to the biomedical, behavioral, and clinical sciences. Having a diverse and sustainable workforce is a primary objective of the office.

Prior to joining the NIH/OD, Dr. Dunn was a program director at the National Cancer Institute. In addition to holding a portfolio of research grants in statistical methodology development, she co-chaired the BD2K Initiative's subcommittee on training.

Dr. Dunn received her Ph.D. in statistics from Carnegie Mellon University and her A.B. in applied mathematics from Harvard College.

**Deborah Lockhart, Ph.D.**

National Science Foundation

Deputy Division Director, Division of Information and Intelligent Systems

Deborah Lockhart received her B.A. in Mathematics from New York University and her M.S. and Ph.D. in Mathematics from Rensselaer Polytechnic Institute. She has been a faculty member at SUNY, College of Geneseo and Michigan Technological University. She joined the NSF's Division of Mathematical Sciences (DMS) as a program director in the Special Projects Program in 1988. In 1993, she became a program director in the Applied Mathematics Program. From 2000 to 2004, she served as chair of the NSF working group for the Mathematical Sciences Priority Area. She was the DMS Executive Officer/Deputy Division Director from 2004 to 2011. Since March 2011, she has been the Deputy Division Director in NSF's Division of Information and Intelligent Systems. Her mathematical interests lie broadly across applied mathematics.

**Adele Merritt, Ph.D.**

National Security Agency

For the past two years, Dr. Adele Merritt has supported a public-private partnership focused on cyber security. Prior, Adele served as a Director and Acting Senior Director on the National Security Council Staff at the White House. She began her federal career at the National Security Agency as an applied research mathematician and has held several positions within the intelligence community where she blended technical and analytic expertise. Prior to joining government service, she was an assistant professor of mathematics. Adele's degrees include a Ph.D. in Mathematics and a B.B.A. in Finance; she served as a National Security Fellow at Harvard Kennedy School.

**Philip Whitman, Ph.D.**

INTECH

Portfolio Manager

Phillip Whitman, Ph.D., is portfolio manager at INTECH, based in Princeton, NJ. Dr. Whitman works with the rest of INTECH's investment team on the application of mathematics in portfolio construction using probability theory, data analysis and other fields in pure and applied mathematics. He has also collaborated in basic research on the nature of the low-volatility anomaly, which has resulted in novel insights that have been presented in conference and in print. He is also involved in maintaining and improving the trading system, and the implementation of the investment process.

While enrolled in the Ph.D. program, Dr. Whitman earned the National Science Foundation Graduate Research Fellowship, one of the nation's most prestigious research fellowships awarded to young scientists.

Dr. Whitman earned his Ph.D. in Mathematics from Princeton University and received his B.S. in Mathematics from the University of Texas at Austin. While at the University of Texas he was a recipient of the National Science Foundation VIGRE grant, which provides funding for independent original mathematical research by undergraduate students.

## Keynote Speaker



### **Shirley Malcom, Ph.D.**

American Association for the Advancement of Science

Head of Education and Human Resources Programs

Shirley Malcom is head of Education and Human Resources Programs at AAAS. She works to improve the quality and increase access to education and careers in STEM fields as well as to enhance public science literacy. Dr. Malcom is a trustee of Caltech and a regent of Morgan State University, and a member of the SUNY Research Council. She is a former member of the National Science Board, the policymaking body of the National Science Foundation, and served on President Clinton's Committee of Advisors on Science and Technology. Malcom, a native of Birmingham, Alabama, received her PhD in ecology from The Pennsylvania State University, masters in zoology from UCLA and bachelor's with distinction in zoology from the University of Washington. She holds 16 honorary degrees.

Malcom serves on the boards of the Heinz Endowments, Public Agenda, the National Math-Science Initiative and Digital Promise. Internationally, she is a leader in efforts to improve access of girls and women to education and careers in science and engineering and to increase use of S&T to empower women and address problems they face in their daily lives, serving as co-chair of the Gender Advisory Board of the UN Commission on S&T for Development and Gender InSITE, a global campaign to deploy S&T to help improve the lives and status of girls and women. In 2003, Dr. Malcom received the Public Welfare Medal of the National Academy of Sciences, the highest award given by the Academy.



# Association for Women in Mathematics

**History:** The Association for Women in Mathematics was established in 1971 to encourage women and girls to study and have active careers in the mathematical sciences. Equal opportunity and equal treatment of women in the mathematical sciences are promoted. AWM's efforts have led to greater participation of women in the mathematical community, especially as speakers at mathematical meetings and as members of committees of the mathematical organizations.

**Membership:** The AWM has approximately 3000 members, both women and men, from the United States and around the world, representing a broad spectrum of the mathematical community. Individual and institutional memberships are available. Student chapters have been established at a number of universities.

**Awards:** AWM annually presents the ALICE T. SCHAFER AWARD for excellence in mathematics by an undergraduate woman, the LOUISE HAY AWARD for contributions to mathematics education, the M. GWENETH HUMPHREYS AWARD for mentorship of undergraduate women in mathematics, the RUTH I. MICHLER PRIZE supporting the scholarship of a recently promoted Associate Professor, the AWM-MICROSOFT RESEARCH PRIZE IN ALGEBRA AND NUMBER THEORY to highlight exceptional research in some area of algebra by a woman early in her career, and the AWM-SADOSKY RESEARCH PRIZE IN ANALYSIS to highlight exceptional research in analysis by a woman early in her career, and starting in 2015, the AWM-JOAN & JOSEPH BIRMAN RESEARCH PRIZE IN TOPOLOGY AND GEOMETRY to highlight exceptional research in topology/geometry by a woman early in her career. The AWM Service Award was established in 2012 to recognize individuals for helping to promote and support women in mathematics through exceptional voluntary service to the Association for Women in Mathematics.

**Professional Support:** TRAVEL GRANTS support women to attend research conferences in their fields. MENTORING TRAVEL GRANTS help junior women to develop a long term working and mentoring relationship with a senior mathematician. Both grants provide opportunities to advance women's research activities and visibility in the research community.

**Lecture Series:** Three lecture series honor women's achievements: the AWM-AMS NOETHER LECTURE for fundamental contributions to the mathematical sciences, the AWM-SIAM KOVALEVSKY LECTURE for work in applied mathematics, and the AWM-MAA ETTA Z. FALCONER LECTURE for distinguished contributions to the mathematical sciences or mathematics education, Biographical profiles of the lecturers and abstracts of their lectures may be found on the AWM website.

**Publications:** The AWM Newsletter contains informative articles, book reviews, announcements of events, and job postings from academic and non-academic organizations.

**Mentoring and Community Involvement:** The essay contest BIOGRAPHIES OF CONTEMPORARY WOMEN IN MATHEMATICS encourages middle school, high school, and college students to explore women's ongoing contributions to the mathematical sciences. The MENTOR NETWORK matches mentors, both men and women, with girls and women, from grade school to post-graduate, who are interested in mathematics or are pursuing careers in mathematics. SONIA KOVALEVSKY HIGH SCHOOL AND MIDDLE SCHOOL MATHEMATICS DAYS support workshops and competitions for female middle and high school students. The TEACHER PARTNERSHIP links teachers of mathematics in schools, museums, technical institutes, two-year colleges, and universities with others working in an environment different from their own, including mathematicians in business and industry.

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