At-a-Glance Schedule

siam 2024

Conference on Mathematics of Data Science

October 21–25, 2024 • Hilton Atlanta, Atlanta, Georgia, U.S.

Online Program and Mobile App

Attendees are encouraged to view the Online Program Schedule:
https://www.siam.org/conferences-events/siam-conferences/mds24/program/program-abstracts/

The Mobile App and Online Program Schedule contain the most up-to-date information.
A searchable abstract document is also posted.

SIAM Events Mobile App

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Sunday, October 20

4:00 p.m. – 8:00 p.m.
Registration
Lobby Registration Area, Lobby Level

4:30 p.m. – 6:00 p.m.
Broader Engagement (BE): Orientation Session (Invitation only)
206, 2nd floor

6:00 p.m. – 8:00 p.m.
Welcome Reception
Grand Ballroom West, 2nd floor

Monday, October 21

8:00 a.m. – 4:00 p.m.
Registration
Lobby Registration Area, Lobby Level

9:00 a.m. – 10:40 a.m.
Concurrent Sessions
MS1 Continuous-in-time Learning for and with Deterministic and Stochastic Dynamics
212-214, 2nd floor
MS2 Advanced Methods in Network Analysis: Learning, Inference, and Dynamic Modeling
215, 2nd floor
MS3 Foundations of Structure-exploiting Flow-based Generative Models
216, 2nd floor
MS4 Mathematics of Explainable AI with Applications to Finance and Medicine
217, 2nd floor
MS5 Scientific Machine Learning for Inference and Control of High-dimensional Systems
218, 2nd floor
MS6 Geometric and Topological Methods in Data Science and Machine Learning
219, 2nd floor
MS7 Recent Advancements in Data-driven Model Reduction: Theory, Algorithms, and Applications
220, 2nd floor
MS8 Learning Functions with Low-Dimensional Structure using Neural Networks
221, 2nd floor
MS9 From Miles to Microns: Combining Machine Learning and Higher-order Spatial Statistics for Scientific Problems in the Data-scarce Regime
222, 2nd floor
MS10 Mathematical Principles in Diffusion Models
223, 2nd floor

9:00 a.m. – 4:30 p.m.
Exhibits Open
Pre-Function Area, 2nd floor

Monday, October 21

10:40 a.m. – 11:10 a.m.
Coffee Break
Grand Ballroom West, 2nd floor

11:10 a.m. – 11:15 a.m.
Welcome Remarks
Grand Salon, 2nd floor

11:15 a.m. – 12:00 p.m.
IP1 Solving Sparse Statistical Optimization Problems by Semismooth Newton Based Proximal Point Algorithms
Kim-Chuan Toh, National University of Singapore, Singapore
Grand Salon, 2nd floor

12:00 p.m. – 1:30 p.m.
Lunch Break
Concurrent Sessions
MT2 Alternative Session: Identifying the Multidisciplinary Competencies for Data Science
210, 2nd floor
MT21 Alternative Session: Hands-on HPC for MDS - Part I
208-209, 2nd floor

1:30 p.m. – 3:10 p.m.
Concurrent Sessions
Broader Engagement (BE): Lightning Talks
206, 2nd floor
MS11 Incorporating Scientific Computation in Machine Learning: Theory and Applications
212-214, 2nd floor
MS12 Compositional Foundations for Optimization and Data Science
215, 2nd floor
MS13 Randomized Iterative Algorithms for Large-scale Matrix and Tensor Data
216, 2nd floor
MS14 Probabilistic Methods in Machine Learning and Complex Systems
217, 2nd floor
MS15 Mathematics of Trustworthy Machine Learning
218, 2nd floor
MS16 Learning Nonlinear Differential Equations from Data
219, 2nd floor
MS17 Recent Trends in Generative Models for Solving Probabilistic Inverse Problems
220, 2nd floor
MS18 Scientific Computation Meets Deep Learning
221, 2nd floor
MS19 Geometric Methods in Data Science and Imaging
222, 2nd floor
MS20 Blackbox Optimization Meets Machine Learning
223, 2nd floor

Monday, October 21

3:10 p.m. – 3:40 p.m.
Coffee Break
Grand Ballroom West, 2nd floor

3:40 p.m. – 4:25 p.m.
IP2 Some Foundations and Fairness in Machine Learning
Deanna Needell, University of California, Los Angeles, U.S.
Grand Salon, 2nd floor

4:25 p.m. – 4:30 p.m.
Intermission

4:30 p.m. – 6:00 p.m.
PP1 Monday Poster Session
Grand Ballroom East, 2nd floor

5:30 p.m. – 7:30 p.m.
Concurrent Sessions
MT5 Alternative Session: Introduction to Geometric Data Science
210, 2nd floor
MT6 Alternative Session: Panel Discussion: Funding Opportunities in the NSF Division of Mathematical Sciences
211, 2nd floor
MT7 Alternative Session: Practical Applications of Data Science in Climate Research: Insights from NASA Internship and Future Work at Oak Ridge National Lab on Adaptive Mesh Refinement and High-Performance Computing
224, 2nd floor
MT30 Alternative Session: Hands-on HPC for MDS - Part II
208-209, 2nd floor

Tuesday, October 22

8:30 a.m. – 4:00 p.m.
Registration
Lobby Registration Area, Lobby Level

9:00 a.m. – 10:40 a.m.
Concurrent Sessions
MS21 Tackling Intractable Optimization
212-214, 2nd floor
MS22 Stochastic Transport in Finite and Infinite Dimensional Generative Models
215, 2nd floor
MS23 Recent Advances in Data Assimilation
216, 2nd floor
MS24 Non-intrusive Computational Methods to Incorporate Prior Knowledge for Improved Statistical Accuracy
217, 2nd floor

Tuesday, October 22

MS25 Systems-Theoretic Approaches to Learning: Applications to Estimation and Control
218, 2nd floor
MS26 Manifold Learning, Trajectory Inference, and Applications in Biology
219, 2nd floor
MS27 Interacting Particle Systems in Data Science: From Theory to Applications
220, 2nd floor
MS28 Scientific Machine Learning for Solving Differential Equations: Computation and Applications
221, 2nd floor
MS29 Complex Weights in Networks and Data Science
222, 2nd floor

9:00 a.m. – 4:30 p.m.
Exhibits Open
Pre-Function Area, 2nd floor

10:40 a.m. – 11:10 a.m.
Coffee Break
Grand Ballroom West, 2nd floor

11:10 a.m. – 11:15 a.m.
Announcements
Grand Salon, 2nd floor

11:15 a.m. – 12:00 p.m.
IP3 The Data and Science of Elections
Moon Duchin, Cornell University, U.S.
Grand Salon, 2nd floor

12:00 p.m. – 1:30 p.m.
Lunch Break
Concurrent Sessions
MT8 Alternative Session: BE: Mathematics of Generative Modeling: Sampling via Transport
208-209, 2nd floor
MT9 Alternative Session: A Fast Algorithm for Single-pass Online Computation of Higher-Order Bivariate Statistics
210, 2nd floor
MT10 Alternative Session: Score-based Generative Models for Inverse Problems
211, 2nd floor

1:30 p.m. – 3:10 p.m.
Concurrent Sessions
Broader Engagement (BE): Mentoring Panel and Networking Session
206, 2nd floor
MS30 Machine Learning on Graphs for Physical Sciences and Data Analysis
212-214, 2nd floor
MS31 Recent Advances of Operator Learning and Foundation-Model-Assisted Multi-Operator Learning
215, 2nd floor

Tuesday, October 22

MS32 Data-Driven Regularization: Theory and Applications
216, 2nd floor
MS33 Sampling and Inferences with Multimodal Distributions
217, 2nd floor
MS34 Early Warning Signals in Medicine
218, 2nd floor
MS35 Recent Advances in Scientific Machine Learning for Data-Driven Discovery of Dynamical Systems
219, 2nd floor
MS37 Optimization Algorithms for Mean-field Games and Applications in Data Science
221, 2nd floor
MS38 Exploring the Intersection of Topological and Geometric Data Analysis with Biological Applications
223, 2nd floor
MS40 Incorporating Geometry in Machine Learning: Theory and Applications
220, 2nd floor

3:10 p.m. – 3:40 p.m.
Coffee Break
Grand Ballroom West, 2nd floor

3:40 p.m. – 4:25 p.m.
SP1 2024 SIAG/DATA Career Prize - Mathematics in Scientific Machine Learning
Rebecca Willett, The University of Chicago, U.S.
Grand Salon, 2nd floor

4:25 p.m. – 4:30 p.m.
Intermission

4:30 p.m. – 6:00 p.m.
PP2 Tuesday Poster Session
Grand Ballroom East, 2nd floor

5:30 p.m. – 7:30 p.m.
Concurrent Sessions
MT11 Alternative Session: Software for Tensor-based Analysis of General Hypergraphs
208-209, 2nd floor
MT12 Alternative Session: How Does a Machine Learn Sequences: an Applied Mathematician's Guide to Transformers, State-Space Models, Mamba, and Beyond
210, 2nd floor
MT13 Alternative Session: Recent Advance of Statistical and Computational Analysis for Physics-informed Machine Learning
211, 2nd floor

7:35 p.m. – 8:30 p.m.
Fireside Chat Event *Complimentary soft drinks and light snacks will be served.*
Grand Salon, 2nd Floor

Wednesday, October 23

8:30 a.m. – 4:00 p.m.
Registration
Lobby Registration Area, Lobby Level

9:00 a.m. – 10:40 a.m.
Concurrent Sessions
MS36 Data Science Meets Neuroscience
215, 2nd floor
MS39 Scientific Machine Learning with Scarce Data
212-214, 2nd floor
MS41 Incorporating Optimal Transport in Machine Learning: Theory and Applications
216, 2nd floor
MS42 Computational Methods for Measure Transport and Generative Modeling
217, 2nd floor
MS43 Advances in PDE Operator Learning
218, 2nd floor
MS44 High-Precision Prediction of Health Metrics Using Machine Learning
219, 2nd floor
MS45 Data-driven Methods in Mathematical Biology
220, 2nd floor
MS46 New Frontier of Privacy in Machine Learning
221, 2nd floor
MS47 Graph Learning and Network Analytics: Framework, Information Flow and Applications
222, 2nd floor
MS48 Smoothing-Based Optimization in Data Science and Machine Learning
223, 2nd floor

9:00 a.m. – 11:30 a.m.
Career Fair Session I
Pre-Function Area, 2nd floor

9:00 a.m. – 4:30 p.m.
Exhibits Open
Pre-Function Area, 2nd floor

10:40 a.m. – 11:10 a.m.
Coffee Break
Grand Ballroom West, 2nd floor

11:10 a.m. – 11:15 a.m.
Announcements
Grand Salon, 2nd floor

11:15 a.m. – 12:00 p.m.
IP4 The Fiction Machine
Léon Bottou, Meta, U.S.
Grand Salon, 2nd floor

Wednesday, October 23

12:00 p.m. – 1:30 p.m.
Lunch Break
Concurrent Sessions
MT14 Alternative Session: Pyomo.DoE 2.0: A Tutorial on Model-building Using Design of Experiments and Parameter Estimation in Pyomo
208-209, 2nd floor
MT15 Alternative Session: Application of Topological Data Analysis to Bring in the Medicine Side: The Convergence of Uncertainty, Topology, and Deep Learning
210, 2nd floor
MT16 Alternative Session: Unifying Spectral and Spatial Graph Neural Networks
211, 2nd floor

1:30 p.m. – 3:10 p.m.
Concurrent Sessions
MS49 Efficient and Robust Optimization Techniques for Structured Data Learning
212-214, 2nd floor
MS50 Processing Data with Geometric Structure: Optimal Transport and Manifold Learning
215, 2nd floor
MS51 Integrating Topological Data Analysis and Data Science with Biological Applications
216, 2nd floor
MS52 Challenges in Data-Driven Learning for Dynamical Systems
217, 2nd floor
MS53 Advances in Fast and Scalable Bayesian Inference
218, 2nd floor
MS54 Randomized Matrix Computations for Large-scale Scientific and Machine Learning Problems
219, 2nd floor
MS55 Recent Advances in Learning from High-Dimensional Data
220, 2nd floor
MS56 Continuous-Time Reinforcement Learning: Bridging Theory, Algorithms, and Applications
221, 2nd floor
MS57 Scientific Machine Learning for Predictive Modeling of Spatiotemporal Physics
222, 2nd floor
MS58 Generative Machine Learning Models for Uncertainty Quantification
223, 2nd floor

1:45 p.m. – 4:15 p.m.
Career Fair Session II
Pre-Function Area, 2nd floor

3:10 p.m. – 3:40 p.m.
Coffee Break
Grand Ballroom West, 2nd floor

Wednesday, October 23

3:40 p.m. – 4:25 p.m.
SP2 2024 SIAG/DATA Early Career Prize: Learning Matchings, Maps, and Trajectories
Jonathan Niles-Weed, New York University, U.S.
Grand Salon, 2nd floor

4:25 p.m. – 4:30 p.m.
Intermission

4:30 p.m. – 6:00 p.m.
PP3 Wednesday Poster Session
Grand Ballroom East, 2nd floor

5:30 p.m. – 7:30 p.m.
Concurrent Sessions
MT17 Alternative Session: Geometric and Topological Methods in Data Analysis
208-209, 2nd floor
MT18 Alternative Session: Physics Informed Neural Network for Advanced Modeling
210, 2nd floor
MT19 Alternative Session: Computing Distances, Similarity Metrics to Enable Analysis of Complex Multimodal Data
211, 2nd floor
MT20 Alternative Session: Graduated and Continuation Optimization Techniques in Data Science and Machine Learning
224, 2nd floor

Thursday, October 24

8:30 a.m. – 4:00 p.m.
Registration
Lobby Registration Area, Lobby Level

9:00 a.m. – 10:40 a.m.
Concurrent Sessions
MS59 The Dynamical View of Machine Learning
212-214, 2nd floor
MS60 Theoretical Advancements in Machine Learning for Solving Partial Differential Equations
215, 2nd floor
MS61 Advances of SDEs in Machine Learning
216, 2nd floor
MS62 Trustworthiness and Privacy in Distributed Learning: Theoretical and Applied Perspectives
217, 2nd floor
MS63 Learning Dimension and Scale Invariant Algorithms
218, 2nd floor
MS64 Recent Advances in Gaussian Process and Kernel Methods
219, 2nd floor

Thursday, October 24

MS65 Data-Driven Scientific Machine Learning for the Optimization of Complex Systems
220, 2nd floor
MS66 Efficient Computation and Learning with Randomized Sampling and Pruning
221, 2nd floor
MS67 Structure in Data: Theory, Learning, and Algorithms
222, 2nd floor

9:00 a.m. – 4:30 p.m.
Exhibits Open
Pre-Function Area, 2nd floor

10:40 a.m. – 11:10 a.m.
Coffee Break
Grand Ballroom West, 2nd floor

11:10 a.m. – 11:15 a.m.
Announcements
Grand Salon, 2nd floor

11:15 a.m. – 12:00 p.m.
IP5 On Parameterizing Optimal Transport with Elastic Costs
Marco Cuturi, Apple, France
Grand Salon, 2nd floor

12:00 p.m. – 1:30 p.m.
Lunch Break
Concurrent Sessions
MT1 Alternative Session: BE: Fundamentals of Deep Learning 1
208-209, 2nd floor
MT23 Alternative Session: A Unified Volume-Optimization Framework for Unsupervised Learning
211, 2nd floor
MT27 Alternative Session: Understanding Double Descent
224, 2nd floor

1:30 p.m. – 3:10 p.m.
Concurrent Sessions
MS68 Foundational Mathematics for AI Model Correctness
212-214, 2nd floor
MS69 Modern Techniques for Big Data Inverse Problems in Data Science
215, 2nd floor
MS70 The Interplay Between Deep Learning and Model Reduction
216, 2nd floor
MS71 Data-Driven Learning of Dynamical Systems from Partial Observations
217, 2nd floor
MS72 Modern Scientific Machine Learning from a Statistical Perspective
218, 2nd floor

Thursday, October 24

MS73 Machine Learning and Shape Optimization
219, 2nd floor
MS75 Computational and Statistical Aspects of Distance-Based Dimension Reduction
221, 2nd floor
MS76 Sampling Algorithms from An Optimization Perspective
222, 2nd floor
MS77 New Frontier of Graph Machine Learning
223, 2nd floor

3:10 p.m. – 3:40 p.m.
Coffee Break
Grand Ballroom West, 2nd floor

3:40 p.m. – 4:25 p.m.
IP6 Smartphone Privacy: How to Learn from Distributed, Private Data
Jelani Nelson, University of California, Berkeley, U.S.
Grand Salon, 2nd floor

4:25 p.m. – 4:30 p.m.
Intermission

4:30 p.m. – 6:00 p.m.
PP4 Thursday Poster Session
Grand Ballroom East, 2nd floor

5:30 p.m. – 7:30 p.m.
Concurrent Sessions
MT4 Alternative Session: BE: Fundamentals of Deep Learning 2
208-209, 2nd floor
MT24 Alternative Session: MamBayes: Model-Free Long-Horizon Time Series Forecasting with Mamba and Bayesian Neural Networks
224, 2nd floor
MT25 Alternative Session: Enhancing Water Accessibility: Optimizing the Shortest Path for Nomadic Communities in Kenya
210, 2nd floor
MT26 Alternative Session: Topological Data Analysis and Machine Learning
211, 2nd floor

6:00 p.m. – 7:00 p.m.
SIAG/DATA Business Meeting *Complimentary beer and wine will be served.*
Grand Salon, 2nd floor

Friday, October 25

8:30 a.m. – 2:00 p.m.
Registration
Lobby Registration Area, Lobby Level

9:00 a.m. – 10:40 a.m.
Concurrent Sessions
Broader Engagement (BE): Guided Affinity Group Presentations & Wrap Up
206, 2nd floor
MS78 Algebraic Geometry and Machine Learning
212-214, 2nd floor
MS79 Topological Learning in Health Sciences
215, 2nd floor
MS80 Recent Advances in Cryo-EM Recovery and Related Problems
216, 2nd floor
MS81 Statistical Learning Methods for Emerging Large-Scale Complex Biological Data
217, 2nd floor
MS82 Distribution, Dynamics, and Deep Learning
218, 2nd floor
MS83 Optimization and Statistics at Scale
219, 2nd floor
MS84 Communication-efficient and Privacy-preserving Federated Learning Algorithms
220, 2nd floor
MS85 Recent Advances in Scientific Deep Learning
221, 2nd floor
MS86 Sparse Solutions and Low Rank Methods for Unsupervised Learning
222, 2nd floor
MS87 Statistical Methods and Uncertainty Quantification
223, 2nd floor

9:00 a.m. – 12:00 p.m.
Exhibits Open
Pre-Function Area, 2nd floor

10:40 a.m. – 11:10 a.m.
Coffee Break
Grand Ballroom West, 2nd floor

11:10 a.m. – 11:15 a.m.
Announcements
Grand Salon, 2nd floor

11:15 a.m. – 12:00 p.m.
IP7 The Emerging Science of Benchmarks
Moritz Hardt, Max Planck Institute for Intelligent Systems, Germany
Grand Salon, 2nd floor

12:00 p.m. – 1:30 p.m.
Concurrent Sessions
Lunch Break
MT28 Alternative Session: Model Reduction for Fluid Flow in Porous Media: Applications to Hydrogen Fuel Cells
210, 2nd floor

Friday, October 25

MT29 Alternative Session: Data Science for Science
211, 2nd floor

1:30 p.m. – 3:10 p.m.
Concurrent Sessions
MS88 Mathematical and Statistical Methods for Promoting Fairness and Equity in Algorithmic Decision-Making
212-214, 2nd floor
MS89 Mathematical Principles in Foundation Models
216, 2nd floor
MS90 Integration of Model and Data-Driven Methods for Large-Scale Inverse Problems
217, 2nd floor
MS91 Topological Data Visualization
218, 2nd floor
MS92 Active and Adaptive Sampling for Data-efficient Machine Learning
219, 2nd floor
MS93 Operator Learning for Dynamical Systems
220, 2nd floor
MS94 Preconditioning for Kernel Matrices
221, 2nd floor
MS95 Data Science Over Groups
222, 2nd floor
MS96 Machine Learning Advances in Scientific Computing and Applications
223, 2nd floor

3:10 p.m. – 3:40 p.m.
Coffee Break
Grand Ballroom West, 2nd floor

3:40 p.m. – 4:25 p.m.
IP8 Tensor Decomposition meets Reproducing Kernel Hilbert Spaces (RKHS)
Tamara G. Kolda, MathSci.ai, U.S.
Grand Salon, 2nd floor

4:25 p.m. – 4:30 p.m.
Closing Remarks
Grand Salon, 2nd floor

4:30 p.m. – 6:00 p.m.
PP5 Friday Poster Session
Grand Ballroom East, 2nd floor

ABBREVIATION KEY
IP = Invited Plenary Speaker
MS = Minisymposium
MT = Alternative Session
PP = Poster Session
SP = Special Lecture

SIAM Activity Group on Data Science (SIAG/DATA)

Society for Industrial and Applied Mathematics

A great way to get involved!

Collaborate and interact with mathematicians and scientists who seek to advance the mathematical, statistical and computational foundations of data science, and pursue applications of data science to other fields of science and across technology and society.

ACTIVITIES INCLUDE

- Biennial conference on Mathematics of Data Science
- Annual SIAM International Conference on Data Mining
- Special sessions at SIAM meetings

BENEFITS OF SIAG/DATA MEMBERSHIP

- Listing in the SIAG's online membership directory
- Discount on registration for SIAG/DATA conferences
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- Access to **SIAM Engage** online community for SIAG/DATA
- Eligibility for candidacy for SIAG/DATA office
- Participation in the selection of SIAG/DATA officers

siam Engage

ELIGIBILITY FOR SIAG/DATA MEMBERSHIP

- Must be a current SIAM member

COST

- $15 per year
- Outreach members can join one SIAM Activity Group for free and student members can join two for free!

2024–2025 SIAG/DATA OFFICERS

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