SIAM MDS2020: Linear Algebraic Tools for Graph Computation (MS142)

Monday, June 29, 10:00am San Francisco / 1:00pm New York / 6:00pm London
Tuesday, June 30, 1:00am Beijing / 3:00am Sydney

Large-scale computations on networks and graphs arise in many areas of modern data science. Graph theory and linear algebra are of course intimately linked. This minisymposium will highlight tools from sparse matrix computation that are being used to develop efficient implementations of graph algorithms. Such tools range from linear algebra over semirings to fast solvers for Laplacian linear systems.

In the former area, matrices over various semirings describe the kernels of a wide variety of graph algorithms in theory, and efficient software for sparse semiring algebra has led to practical, scalable implementations with significant impact. In the latter area, the so-called Laplacian paradigm has lately challenged or replaced the asymptotically best algorithms known for such classic network problems as multicommodity flow, and we anticipate that fast Laplacian solvers will become a standard building block for graph and network software.

The minisymposium opens with two talks on sparse semirings for graph computation, the first on theory and the second on efficient implementation and software. The last two talks highlight current work in graph Laplacians and their applications, and describe a number of applications of the linear algebraic approach to graph computation.

This minisymposium is organized under the auspices of the SIAM Activity Group on Applied and Computational Discrete Algorithms.

Organizers: John R. Gilbert, University of California, Santa Barbara
Jeremy Kepner, Massachusetts Institute of Technology

Date and Time: Monday, June 29, 2020, 1:00pm - 3:00pm Eastern Daylight Time

Zoom: https://ucsb.zoom.us/j/91087364439?pwd=clVIZkMrRVhCOWZoczVyUnNSZ3ZIUT09

1:00-1:26 Mathematical Foundations of the GraphBLAS and Big Data (abstract; slides; video)
Jeremy Kepner, Massachusetts Institute of Technology; Hayden Jananthan, Vanderbilt University

1:26-1:52 SuiteSparse:GraphBLAS, a Parallel Implementation of the GraphBLAS Specification (abstract; slides; video)
Timothy A. Davis, Texas A&M University

1:52-2:18 High Performance Linear System Solvers with Focus on Graph Laplacians (abstract; slides; video)
Richard Peng, Georgia Institute of Technology

2:18-2:44 Sparse Matrices Beyond Solvers: Graphs, Biology, and Machine Learning (abstract; slides; video)
Aydin Buluc, Lawrence Berkeley National Laboratory

2:44-3:00 Questions and Discussion (video)

Conference Website: https://www.siam.org/conferences/cm/conference/mds20

Full Conference Program:
https://siam9-my.sharepoint.com/:x:/g/personal/moore_siam_org/EYTLcxWB41NJs2SqNhuHv4UB 9SGkLksNw5_3jt-pJP1biw

Complete Zoom Information:
Topic: SIAM MDS 2020 MS 142
Time: Jun 29, 2020 10:00 AM Pacific Time (US and Canada)

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