APPLIED MATHEMATICS COLLOQUIUM

Scaling and Broadening the Scope of Computational Transport

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Abstract: The theory of optimal transport links probability to geometry, providing a natural means to characterize, compare, and manipulate probability distributions supported on a geometric domain. While optimal transport has long been identified as a candidate for improving pipelines in computer vision, graphics, statistics, and other disciplines, computational considerations have made it challenging to apply in practice; recent improvements in the computational pipeline, however, have motivated renewed interest in this discipline among members of the computer science community.

In this talk, I will discuss recent efforts jointly with collaborators and students in the MIT Geometric Data Processing Group to develop efficient algorithms for computational optimal transport and derived problems, leveraging structure in key applications of this machinery. I will highlight new techniques for stochastic transport, transport along discrete surfaces, and transport along graphs, as well as extensions of the basic problem to tensor-valued measures and to quadratic assignment problems.

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