Algorithmic Convex Geometry

organized by
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Workshop Summary

The workshop on Algorithmic Convex Geometry held Nov 5th–9th, 2007, brought together theoretical computer scientists, analysts and statisticians. Convex geometry is a mature field with many beautiful results and conjectures. Yet, its recent interaction with algorithms has taken it unexpected and exciting directions. Perhaps foremost of these is new isoperimetric inequalities, used to analyze Markov chains in high dimensional convex bodies (and logconcave distributions). The latter are used in efficient algorithms for sampling, optimization and integration. These were the topics of one set of lectures at the workshop (given by S. Vempala) and drew much interest from all three groups of attendees. In addition, there were lectures by G. Paouris, M. Rudelson and O. Guedon on new concentration results, E. Milman on a unified perspective for Cheeger-type inequalities, R. Vershynin and A. Naor on algorithmic applications and by P. Bartlett and Y. Peres on applications to statistics. There were lively discussions both during the talks and in the afternoon group sessions. The problem session was representative of the broad interest in the topic with the range of problems proposed. Several collaborations were started and some continued during and after the meeting.

The workshop was a great success and the attendees and organizers are grateful to AIM for making it possible. The staff at AIM, with their experience, played a useful role in structuring the format to make it most productive.