

Several Geometric Tiling and Packing Problem With Applications To Nonoverlapping local alignments, DNA microarray designs and Homology Searches

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In this talk, we will discuss several geometric tiling and packing problems in one or more dimensions that have applications to several areas in computational biology such as nonoverlapping local alignments, DNA microarray designs and homology searches in database. For example, a typical problem considered is to find a set of "independent" rectangles of total maximum weight giving a set of local alignments between two DNA sequences. Our main goal is to design linear or near-linear time exact or approximation algorithms for these problems. I will also mention useful open problems that could be of interest.

Most of the results discussed in this talk has appeared in the following conferences and the corresponding papers are available from the websites mentioned below:

- Piotr Berman, Bhaskar DasGupta and S. Muthukrishnan, Simple Approximation Algorithm for Nonoverlapping Local Alignments, 13th ACM-SIAM Symposium on Discrete Algorithms (SODA), pp. 677-678, January 2002. (<http://www.cs.uic.edu/dasgupta/resume/publ/papers/bh.ps.Z>)
- Piotr Berman, Paul Bertone, Bhaskar DasGupta, Mark Gerstein, Ming-Yang Kao and Michael Snyder, Fast Optimal Genome Tiling with Applications to Microarray Design and Homology Search, 2nd International Workshop on Algorithms in Bioinformatics (WABI 2002), LNCS 2452, R. Guigo and D. Gusfield (editors), Springer Verlag, pp. 419-433, September 2002. (<http://www.cs.uic.edu/dasgupta/resume/publ/papers/paper3-wabi02.ps.Z>)