The complex structure of chromatin

Chromatin is the whole DNA chain bound to proteins and RNA in the cellular nucleus. It is believed that the biological role of chromatin is not only that of packing DNA in a small volume, but also that of controlling gene expression, resulting in an epigenetic control on the cell. Recently, a class of experimental techniques has been used to obtain contact maps of chromatin on the length scale of few kilobases. These contact maps are structured in blocks, suggesting that the chromatin fiber is assembled in small globules. Making use of polymer theory and of computer simulations based on the available experimental data, we investigate the conformational properties of the chromatin chain, trying to relate them to the activity of the associated genes.