

Inhomogeneity for Life: the DNA Template by Dr. Alan R. Bishop

Accessing the genetic code stored in DNA is central to fundamental biological processes such as replication and transcription. This requires that the extraordinarily stable double helix structure must open locally to access the bases. We describe an extremely successful modeling of this phenomenon in terms of 'bubbles', coherent conformational openings in very specific locations, controlled by gene sequence, and temperature regimes. We compare predictions with experimented data and extend the possible roles of bubble conformations to protein binding, allostery, and THz radiation effects on gene expression. Finally, we draw analogies with the growing appreciation for functional mesoscale inhomogeneities in wide classes of organic and inorganic materials.