Department of Mathematics and Statistics

Colloquium Series

Knotting and linking of DNA, polymers, and random graph embeddings

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Abstract: Just like your headphone or charger cables in your pockets always seem to come out tangled up, DNA crammed into small spaces like the nucleus of a cell can become knotted or linked. This behavior can be studied using tools from knot theory. We will introduce some of these tools and discuss some of the ideas behind a series of results that show that as the length of a polymer increases, the probability that it is knotted goes to 1. These techniques can then be adapted to study the behavior of more complex molecules by studying embeddings of graphs. In some cases, random models prefer the "topologically simplest" spatial configurations as observed in practice, but there are still many questions, both theoretical and practical, waiting to be answered.

Keywords: Spatial graph embeddings, knot theory

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