

## **Steps towards a theory of loop extrusion**

Loop extrusion has proved to be an attractive explanation for a wealth of genome structures such as TADs, jets, dots, stripes, and bottle brushes. With the improvement of experimental tools, Hi-C and imaging data are now rich in clues hinting at the loop extrusion mechanism itself. To put this information to use, one faces the challenge of reverse-engineering emergent properties of a polymer back to the microscopic rules governing it. Here I present my progress towards an analytical theory of loop extrusion useful for performing this task. The theory allows direct calculation of Hi-C features, contact frequencies, and Chip-seq tracks without resort to simulation. Apart from speedups in calculation, it allows direct assessment of how the microscopic parameters determine the emergent properties of chromatin under the action of loop extrusion. These results may prove useful as a new way of thinking about the loop extrusion process in the future.