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### **Summer Undergraduate Research (SUR) Programme 2025**

#### **Project description:**

In multicellular organisms, genes are turned ON and OFF in robust spatial and temporal patterns. Regulatory elements that activate or silence gene transcription are inherently promiscuous and can act over long genomic distances. A basic question is how regulatory elements find their target promoters and restrict their activity to their targets. We are currently investigating how genes find their appropriate regulatory elements across surprisingly long genomic distances and skip over non-target genes. We address the biological relevance of these long-range interactions by disrupting them *in vivo*. We also study how they form, by identifying proteins that bind to these loci and mediate their long-range interactions, and by assessing how these interactions vary between cell types. In sum, our studies in *Drosophila* reveal new evolutionary perspectives into the relevance of 3D genome folding for correctly wiring genes to their regulatory elements.