Rhoslyn Coles: Knotted and linked curves through the shape of their tubular neighbourhoods.

In my work I investigate low energy curves within classes of thickened knots and links of fixed length. Inspired by a simple geometric approach to the thermodynamics of solvation, I investigate energetically favourable curve configurations for energy functionals given as the linear sum of four geometric measures evaluated on a tubular neighbourhood of the curve.

In this talk I will introduce this energy and show some of the results from the computational simulations I have performed, which deform an input curve towards a shape of lower energy without lengthening or changing the knot type of the curve. Since the energy is very general–a linear combination of geometric functionals–low energy shapes are found for a range of energy functionals. Of particular interest, is how these low energy curve configurations are related to each other within the same class. In this sense, my work is a new, very physical perspective on knots and links as mathematical objects, and on entanglement in general.

This is joint work with my PhD supervisor Prof. Myf Evans of Potsdam Universität and our collaborator Prof. Roland Roth of the Universität Tübingen.