RYAN BUDNEY, University of Victoria
What operads have to say about knots

This talk will be an overview of how certain operads relate to classical knot theory in the sense of the study of smooth embeddings of one sphere in another. There is an operad called "the splicing operad" which in dimension 3 gives an essentially complete description of the homotopy-type of the space of knots up to the solution of some rather subtle problems in 3-dimensional hyperbolic geometry. For embeddings of the circle in high-dimensional spheres, the splicing operad generates "cabling" operations which generate Turchin's "Hodge decomposition" for the Vassiliev spectral sequence for spaces of knots. It also gives rise to a rather unexpected connection between automorphisms of free groups and spaces of knots. In high dimensions there are also connections to algebraic k-theory via the work of Igusa, Hatcher, Farrell and Quillen.