Configurations of Spheres (by Woden Kusner)

In 1694, Newton and Gregory discussed how many non-overlapping unit spheres could be placed in contact with a central unit sphere: Is it 12 or possibly 13? This problem was unresolved until 1953, when Schütte and van der Waerden showed that 12 was the correct answer.

An alternate formulation, related to the Tammes best packing problem, is to consider the configuration space of 13 spheres touching a central sphere parametrized by radius and show that it is empty for radius 1.

This point of view opens up a variety of new configurational problems, namely, how does the geometry and topology of such a configuration space change as the radius is varied?

We will discuss some of the history and the current state of these problems.

This talk is related to the course

MAT670: Summer Term 2016
Packings, Lattices and Configurations