Classification of Tight Contact Structures on a Solid Torus

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It is a basic question in contact geometry to classify all non-isotopic tight contact structures on a given 3-manifold. If the manifold has a boundary, this classification is based on the dividing set on the boundary. In my research, I answered the classification question completely for the case of a solid torus by writing down a closed formula for the number of non-isotopic tight contact structures with any given dividing set on the boundary of the solid torus. To do this, I used a novel technique known as bypass induction, in which I showed that bypass attachments could be used to simplify the dividing set. This allowed me to obtain and solve a recurrence relation. Previously, the only fully classified 3-manifold was the 3-ball, and only a few special cases on the solid torus were known by Honda (2000).

Awards Won:

Second Award of $2,000

American Mathematical Society: First Award of $2,000