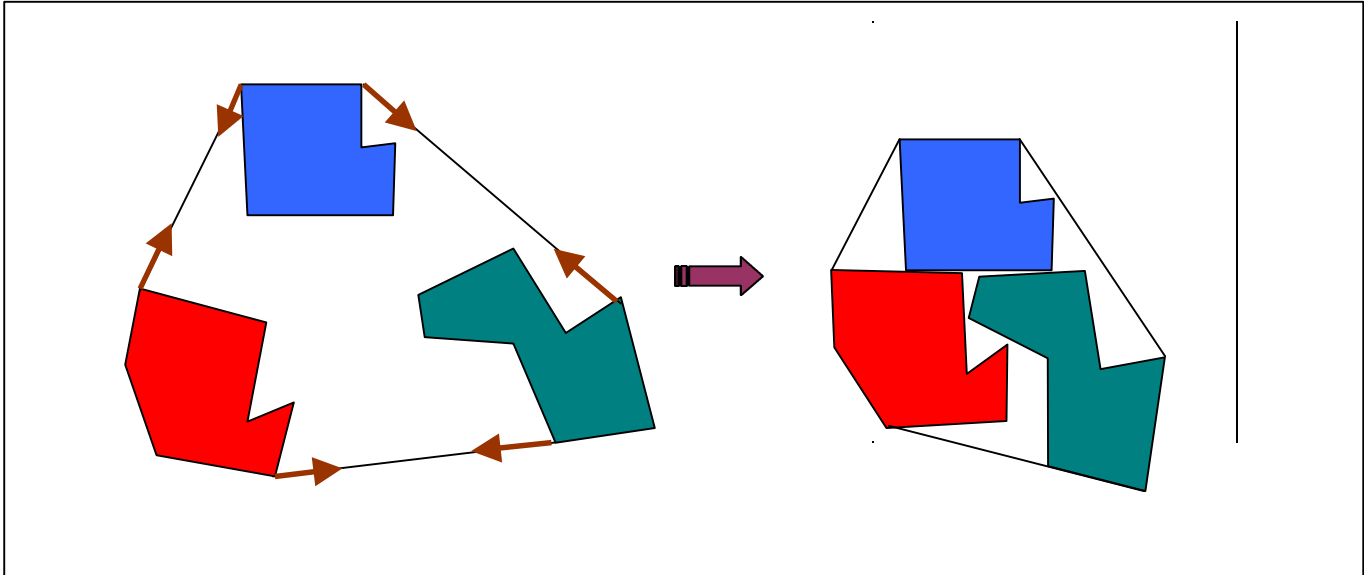


Project Title: PACKING OPTIMIZATION USING A RUBBER BAND ANALOGY



Project Leaders: Todd McKee, MS Candidate (2D), Avijit Sinha, MS Candidate (3D)
Tel: (864) 656-7189
mail-to: asinha@eng.clemson.edu

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Project Abstract:

Packing problems have been investigated extensively by mathematicians and OR researchers. Recently, with the advances in capabilities of computers, engineers have started to tackle engineering packing problems, especially when considering more than one objective. Typically, gradient based optimization or heuristic methods or combinatorial methods are used to solve such problems.

In this research, we observed that to bring objects together (without switching the relative position of components), one can use the analogy of a rubber band stretched around the objects in a two dimensional space or a balloon stretched around the components in a three dimensional space. Using this analogy, the convex hull can be used to determine the direction of forces applied to a single component, and a motion can result from the application of such forces. The objects can then be moved until contact occurs, at which point the forces become moments, and the objects can rotate with respect to each other. This technique can guarantee a local optimal packing, and displays a very intuitive behavior that might lead to further advances in optimization.