Creating and Assessing a Tool to Organize Graphs Using Hooke's Law

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The purpose of this study is to develop a tool to organize graphs utilizing Hooke’s law, and to assess its abilities in terms of the organization of graphs. Graphs that satisfy certain conditions can be organized by simulating them as a physical system: all vertices in a face of the graph are fixed in place, and the edges are treated as Hookean springs which, when simulated, reorganize the position of the vertices in space. This leads to graphs without intersecting edges and with shorter edges, resulting in better organized graphs. The graphs produced can be thought of as having a state of low potential energy, which allows for certain physical applications. This tool can be used to reorganize graphs that cannot be represented in two dimensions; while these graphs are not easy to visualize, the results could be more generally used to organize data.

Awards Won:
American Mathematical Society: Honorable Mention and One-Year Membership to AMS (for 5 projects with up to 3 team members per project)