Abstract
After surveying consumers on the flaws of current coat-hangers, it was determined that in their design, few solutions have addressed the needs of consumers with limited storage space. Thus the Tracto-Hanger was designed to meet these needs through a collapsible model that is the size of a normal hanger when in use, yet is the size of a small cylinder when collapsed. After designing the Tracto-Hanger, several tests were conducted with FEM to determine which materials would be most feasible in its construction. Through an iterative design coupled with testing, the final model was chosen with maximizing cost / performance.

Design Iteration
The conceptual design of the Tracto-Hanger was developed as the quarter progressed. Throughout our weekly meetings, the design of the Tracto-Hanger kept improving based on the research and project requirements. The initial conceptual design consisted of a collapsible hanger that made use of telescoping technology. After several analyses, this design included spherical ends that prevented deformation of clothing on the shoulders, and foldable aluminum supports to hang ties and pants.

Analysis
After the design was finalized a cad model was created. Before a prototype was built, Abaqus was used for a finite element simulation of the hanger model under stress with a simulated plastic material. Applying a total load of 15 lbs (a weight close to a heavy set of clothes), the coat hanger showed little to no strain within the hanger structure. The result shows that building the hanger out of plastic is feasible, and doesn't introduce the chance for premature failure.

Results
Based on FEM and independent research we made most of our decisions regarding performance requirements using a cost performance ratio. We concluded that the Tracto-Hanger would not be hindered through rigidity reliability or quality if it was composed of plastic. Overall we were happy with the results in terms of maintaining a quality robust product while minimizing cost.

Acknowledgments
Nelson Bednersh, Stephen LaGugue, Andy Weinberg,

References
Abaqus, Solidworks.