Water Pump
MAE 2250

Project Description
You and your team have just started your own engineering consulting firm and are competing for your first contract. A new car company is building its first supercar and has decided to outsource some of the design work. The car needs a pump to circulate water through the engine and radiator. Your team must design and prototype a light, efficient water pump to meet their basic requirements and outperform the competition to ensure you win the contract.

Performance Metrics
The pump must operate with a minimum flowrate of 1 liter/minute and will be ranked against the competition based on the ratio of flowrate to mass, [liter/minute·pounds].

Project Restrictions
The pump must abide by the following spatial limitations:

- The maximum piston diameter must be less than 2 inches.
- The drive shaft diameter is ½ inches.
- The pump must have a volume of less than 1 ft³, though motor components can be rearranged to accommodate various permutations of length, width, and height.
- The pump must mount to the motor bolt-hole pattern.

Machining
Your consulting firm does not own a machine shop and must rent time to fabricate your prototype. Since the shop has limited hours available designing should be done with ease of manufacture in mind and any lightening of the pumps should be limited to the end of your fabrication process.
Budget
You group will keep track of two separate budgets for this project, the prototyping budget and the production budget. Your prototyping budget is the cost of the stock used to fabricate your prototype and the production budget is the unit cost were you to win the contract and mass produce your pump. The production budget is purely a piece of information to deliver to the customer and not funds you can use for the development of your prototype. Exceeding either of the proscribed budgets will have significant repercussions as both your consulting firm and the car company are new businesses operating with limited capital.

- $40 Prototyping Budget
- $40 Production Budget