

MAE 189 Capstone Design:

Human-Powered Vehicle



Team Members:

Shuhao Zhang

Anthony Atz

Gabriel Vergara

Bryan Lam

Benjamin Moreno

Abhijith Jose

Team Name: Anteater Powered Vehicle

Sponsor: Professor David Copp

April 10, 2022

1 Team Formation

1.1 Introduction

The purpose of this document is to introduce the design project along with the team members and their assigned roles. ASME's Human Powered Vehicle Challenge (HPVC) is a competition in which students participate in racing a human powered vehicle that they have designed. Through this project, students are able to apply their knowledge about engineering principles in order to design a successful and competitive vehicle.

During the quarter, this team will design a human powered vehicle able to be ridden by one person that can complete one or two competitions held by ASME, which include speed competition, endurance competition, and practical usage exam. Although no actual prototype will be made this quarter, the project team is required to come up with a completely designed plan for the human powered vehicle's assembly and testing.

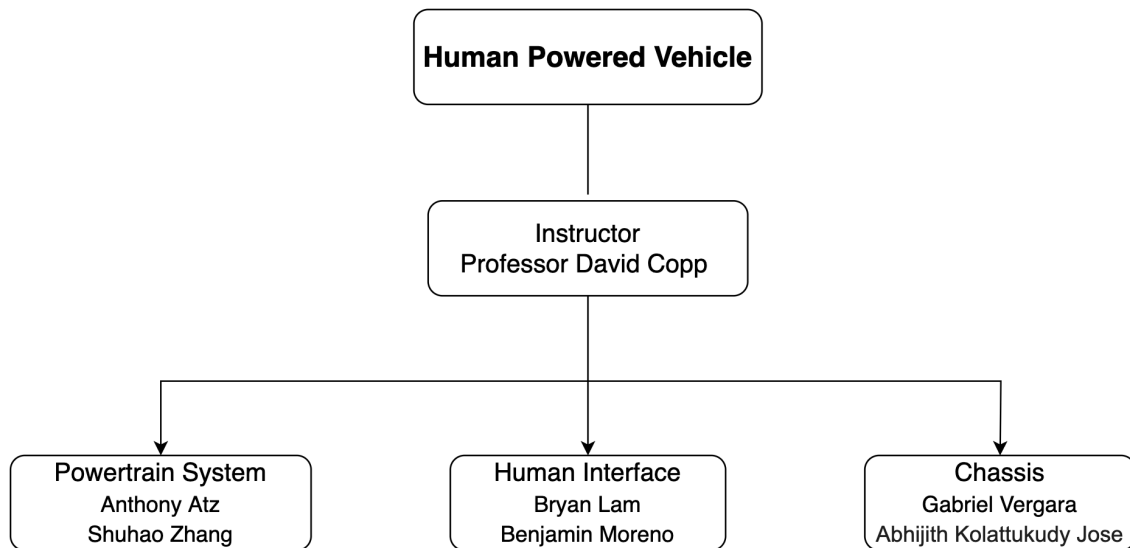
1.2 Team Name

The team name that we have chosen is Anteater Powered Vehicle. The team decided on this name through our Discord channel. Another name that was mentioned was Anteatermobile, but we decided to give that name to the actual vehicle as opposed to the team. The name Anteater Powered Vehicle applies directly to the project name Human Powered Vehicle, which makes it appropriate for a team name to be distinguished from others.

1.3 Team Goal

The overarching goal of the project is to design a final CAD model in SolidWorks with appropriate analysis for each component by the end of the quarter. Additionally, a complete bill of materials and manufacturing plan will be compiled for future groups to use. Project milestones will be the preliminary design, the detailed design, and finally, the final design model. The preliminary design will consist of brainstorming ideas for each component and utilizing decision matrices to determine the optimal design. This portion can include preliminary CAD models as well. The detailed design should be a rough CAD model of our complete design, with calculations done to support design choices. The final design model should consist of the final CAD model with all calculations completed as well as a complete bill of materials and manufacturing plan.

1.4 Organizational (Org) Chart



1.5 Identify Support Structure and Available Resources

In order to help the team be successful, a variety of support structures and resources are available to us. This includes our project sponsor Professor Copp, who we will meet with on a weekly basis on Fridays at 1 PM in ET 302. As for our resources, we will be referring to ASME's HPVC Rules PDF because it includes many other resources to help with our design including vehicle design, materials, and most importantly all the requirements needed for a valid vehicle design. If the design process goes as far as manufacturing, we will be using UCI's labs to manufacture any parts we need (e.g, welding parts together for the chassis, using a drill press, etc.). Our budget for this project is \$1000. We will be using this amount to purchase the parts we need to make our project successful.

Support Structure

Professor **David Copp**
(Instructors)

Available Resources

FABworks (manufacturing)
UCI Libraries (reference)
Solidworks (simulation, CAD)
MATLAB (data analysis)
ASME (website)

1.6 Team Communication Plan

Aside from the weekly meetings with the sponsor on Fridays at 1 PM, the team plans on holding a separate meeting on Wednesdays from 8 to 10 PM via Discord voice chat to check in with each other's progress, assign tasks, and clear up any questions or confusions about the project. Subteams will also be meeting together throughout the week to ensure progress is made before every team meeting. In between meetings, the team will continue to use Discord to communicate with each other and work with one another on assigned tasks. Additionally, personal phone numbers can be used for more urgent communication and in the event that one member is not reachable through Discord.

1.7 Team Contract

The team contract is a crucial step in moving forward with this project as it ensures that the team will work together and keep them accountable. Collaboration is absolutely essential to carrying out a final product as individually it is an impossible task. Collaboration allows for the amalgamation of different skills and talents, and support for each other. This team contract helps tie the team together to ensure we can accomplish our task successfully.

Subteam meetings will tend to take place a couple days before the internal team meetings. All the subteams should either meet, or work with other subteams throughout the week to finish the specific tasks given to them. One member must write down the agenda to go through these assignments, so that the internal team meeting will be carried out in a timely manner. During the Wednesday internal team meeting, one member will be taking minutes. All subteams will present their work and assignment status; subsequently, the team will put it all together, and settle team-wide tasks. After this, the team will work on a status report to present to the project sponsor on Friday at 1pm. In every single meeting, all team members' opinions and dignity will be respected, and will be as inclusive as possible. More details on rules will be provided below:

- *Honesty*

- Be completely transparent of how work you have done throughout the week.
- Contact the whole team if a problem arises and if it affects another team's subsection.
- *Appropriate behavior*
 - Remain open-minded to other team members' ideas revolving around the project and not berate them.
 - Be able to respectfully disagree with another team member's idea or input.
- *Budget*
 - Consult and inform the whole team when in the process of spending money from the team budget
 - Have a projected cost of parts, labor, etc. as the project progresses throughout the rest of the quarter
- *Decision making*
 - Any significant decisions within a subgroup have to be agreed upon by the other members within that subgroup.
 - Any decisions that have an impact with another subgroup must be agreed upon by both parties.
- *Team coordination*
 - Do not feel discouraged to ask for help by other team members
 - When making decisions that are affecting other team members' work, request input from other team members.
 - Any possible delays/absences should be made aware in advance to avoid deadline issues
- *Punctuality*
 - All team members are required to be in a meeting area at a scheduled time, unless excused before hand
 - Must be able to stay on schedule when required to carry out task

If some negative actions, conflicts, or inactions were to occur between team members, the team should first attempt to resolve the issue whether it be through an in-person meeting or a Discord meeting. However, if it seems to be too big of a problem, the team must contact the instructors to figure out a course of action. It is in the best interest of the team that any issues that arise must be resolved immediately to prevent more issues from unfolding.

1.8 Roster and Signatures

Name	Phone	UCInetID	Major	Class*	Signature
Anthony Atz	(323) 316-3620	aatz	ME	189	Anthony Atz

Shuhao Zhang	(949) 992-6522	shuhaoz2	ME	189	Shuhao Zhang
Gabriel Vergara	(818) 792-7989	gvergar2	ME	189	Gabriel Vergara
Bryan Lam	(415) 324-9322	bdlam1	ME	189	Bryan Lam
Benjamin Moreno	(949)546-5877	morenobr	ME	189	Benjamin Moreno
Abhijith Jose	(909) 362-6275	joseak	ME	189	Abhijith Jose

Sponsor/Advisor Approval: _____

Signature

Date