# Cycling Aid

# Problem

Disabilities affecting the use of one's arms can be a major barrier to the enjoyment of cycling. People who suffer from arm amputations are not able to participate in recreational cycling or transportation cycling such as biking to work, school, recreational activities, etc.

# **Balancing System**

#### Explanation

In order to assist with balancing the bicycle at low speeds, we designed an automated training wheel system that would lower the wheels at low speeds and raise them at high speeds.

#### Design





**Final Product** 









The most challenging part is creating a design that accommodates as many people with arm or motor disabilities as possible. The design needs to be adjustable to fit different genders and body shapes. It will be important to create attachments that are easily installable for the user or that can be taken to a local bike shop install. Our attachments must be designed to adhere to a bike like common bike attachments are to avoid installation difficulties.

Our project combines a balancing element, steering element, and braking element to allow safe use of a bicycle and can be installed at a regular bike shop.

# **Braking System**

### **Explanation**

We sought out to create a braking system that would allow the user to easily stop/slow down the bicycle without the use of their arm. The design below is intended to be easily mounted to the middle tube of the bicycle and will be actuated by the user's knees.

#### Design



# **Final Product**







# **Steering System**

### Explanation

To help an amputated rider steer a bicycle, our team decided to mechanically connect the rider to the handlebar from the chest. We accomplished this by having ball joints acting as a shoulder and wrist joint. Between these ball joints is telescoping tubes so that the user can adjust the system to their body. One major problem was disconnecting the chest brace from the telescoping tubes in the event of a crash to avoid injury. We used a shear pin and couple to solve this. At a certain shear stress the couple will shear the pin and the brace will disconnect from the bike allowing the user to fall backwards off the bike.

# Design





# **Final Product**



# **Features**

- Weather-proof
- Two power switches
- steering linkage

# **Final Design**







• Safety shear pin in case of crash

• Rechargeable actuator power battery

• Adaptable for different riders with telescoping

