Improved Ankle-Foot Prosthesis
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Background
The number of below the knee amputees is rising, and the prosthetics needed to return amputees to their normal lives can be expensive.

On top of this, while bionic prostheses are approaching the range of motion of a natural ankle, there are few prostheses, especially those without motors, that allow eversion and inversion of the foot.

Proposed Design and Design Testing
The design uses a planetary bevel gear design to allow for the additional range of motion. Due to interference of the parts, the foot connection had to be shifted toward the front of the foot to allow for planned range of motion.

Prototype
A prototype is being assembled and readied for testing. Some parts were 3D printed to allow for changes as needed to ensure proper meshing of the gears.

Aim
The hope of this project is to create a prosthetic that allows for the additional motion and while still being affordable to those who need it.

Conclusion/Future Work
The prosthesis will be tested to determine if the design works as intended.

Baxter (a manufacturing robot used in a university robotics lab) will be programmed to “walk” the prosthesis along an angled plate.

The prosthesis, along with designs currently available will be tested to determine effectiveness of the design.

Acknowledgements
I would like to acknowledge Dr. Nelson, for technical support and use of Baxter and other equipment.

Background Image
https://www.dartmouth.edu/~humananatomy/figures/chapter_17/17-6.HTM

Prototype Images
Initial design before thickening frames
Stress testing of thickened L-Frame
Design used for testing, view of secondary motion
Design used for testing, view of foot connector, primary motion