Gait Simulator for Prosthetic Feet

Overview
The Jaipur foot is a prosthetic device offered for free to lower limb amputees in India. Another alternative is a Polyurethane foot which can be manufactured more quickly and consistently compared to the Jaipur foot. Both can help amputees restore lost livelihood due to the loss of a limb, but both have the tendency to fail during use. Investigating the cause of failure is important in helping to make both types of feet more durable.

Objectives
Our team’s objective was to determine the center of pressure and rollover shape of both the Jaipur and Polyurethane feet to gain a better understanding of where pressure builds up and the possible failure mechanisms.

Approach
- Established customer needs based on project goals
- Researched relevant patents for prosthetic feet
- Conducted Skype meeting with sponsor in MIT
- Drew four potential loading mechanism designs to investigate
- Drew design that best met customer needs in CAD
- Purchased necessary steel materials to construct loading mechanism
- Fabricated prototype using learning factory resources
- Tested loading mechanism and feet using pedobarograph in Kinesiology department
- Generated pressure maps for Jaipur and Polyurethane feet compared to human feet

Outcomes
The outcomes for this project:
- Novel loading mechanism for both Jaipur and Polyurethane feet to test pressure build-up within feet
- Mimics the walking motion, from heel strike to toe-off
- CAD drawings are detailed and thorough so it can be easily replicated if needed
- Compatible with any force plate/pedobarograph and can be used stateside or abroad