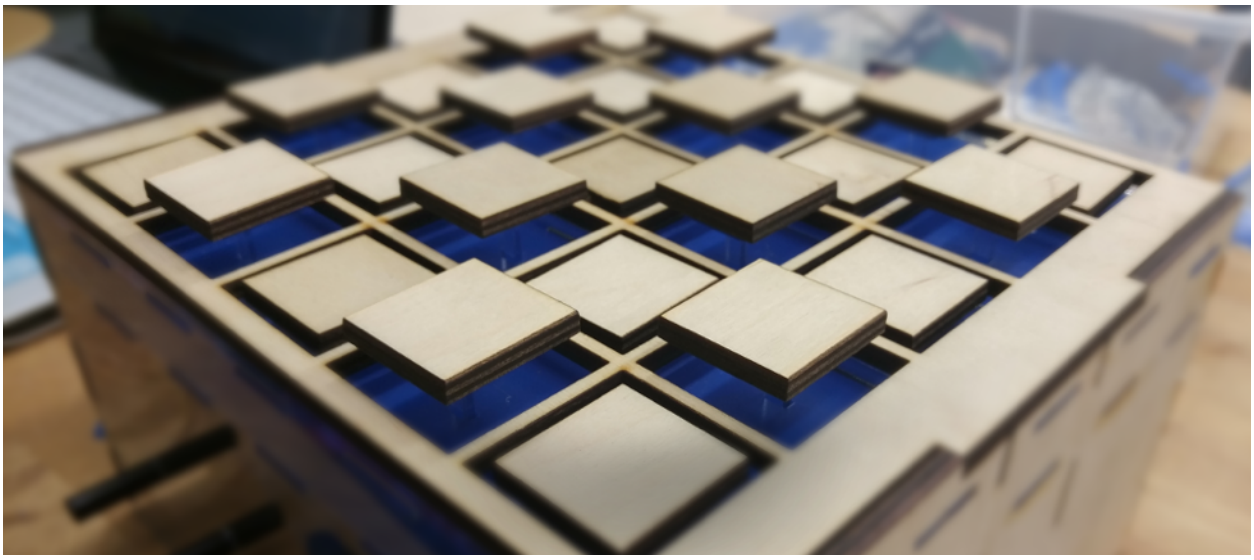
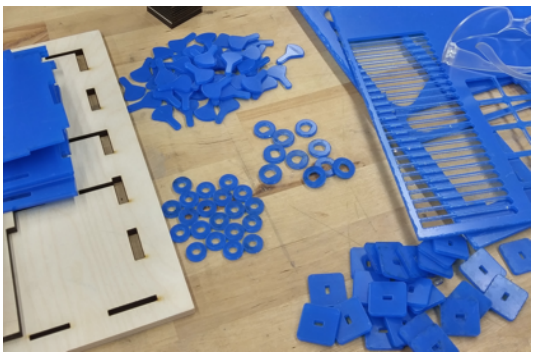
Bruno De Hoyos

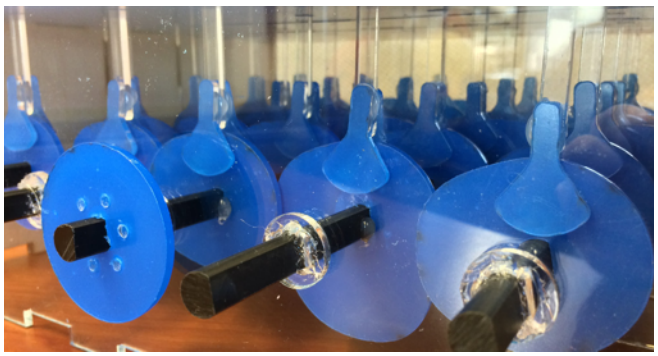
Portfolio of select projects and past work

3D Shape Display | December 2015

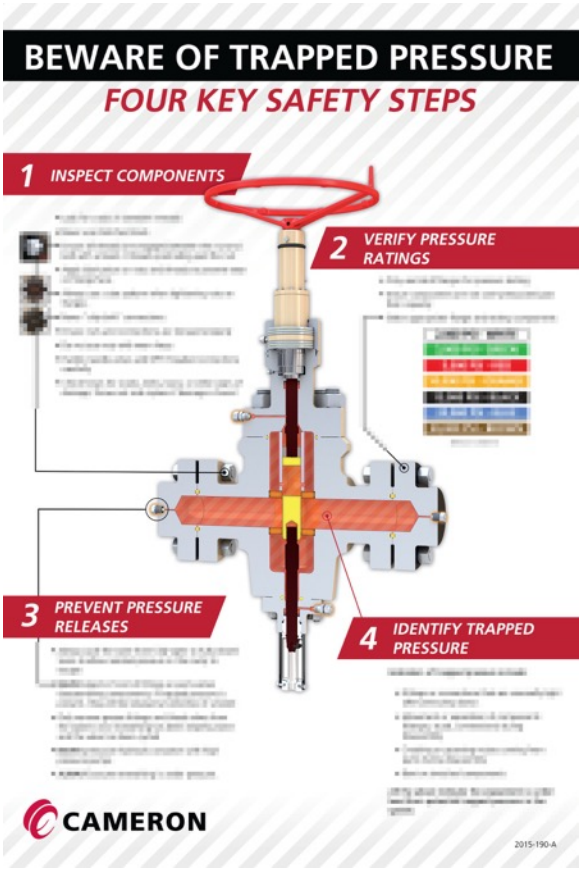


A cam-driven robotic mechanism for displaying 3D content through a matrix of tiles. Although this dynamic shape display was inspired by the MIT inFORM, a key difference between the two is that this mechanism manipulates all 25 output tiles through a single actuator, as opposed to having one actuator per tile. All motions of this display are driven by custom-designed internal cams, making the output motions a 'hardcoded' design. Cam profiles were designed such that dynamic forces were minimized during rotations, and included 4 different output configurations.

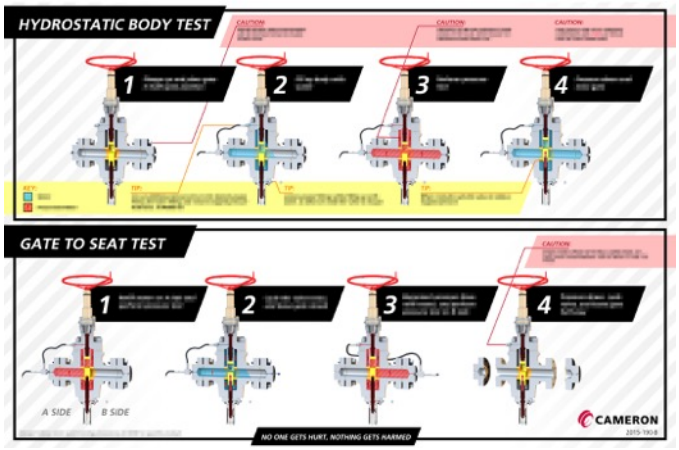




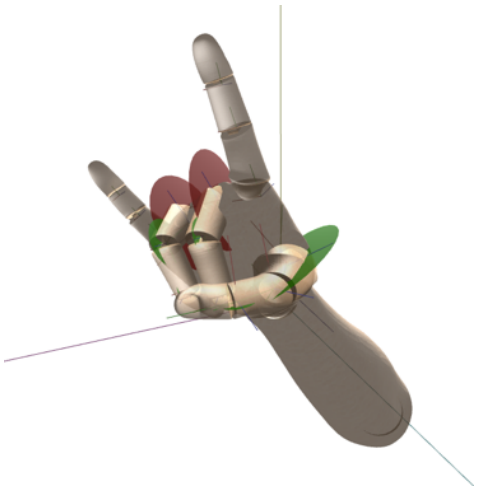
Pressure Testing Safety Improvement Project, Cameron | Summer 2015

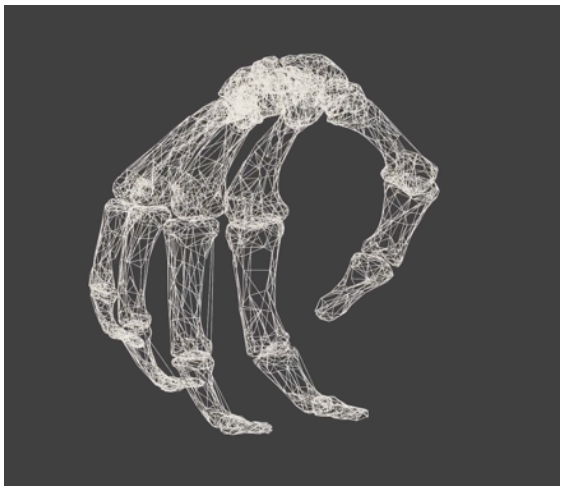


Pressure testing training materials for standardizing and improving testing procedures of gate valves across North American facilities. Training materials consisted of large posters installed at pressure bunkers of gate valve manufacturing facilities, as well as an interactive, 45 minute long online training course with a 65 question quiz that was assigned to over 750 employees. Materials were developed and deployed with close collaboration with HSE, marketing, human resources, engineering, and shop personnel.

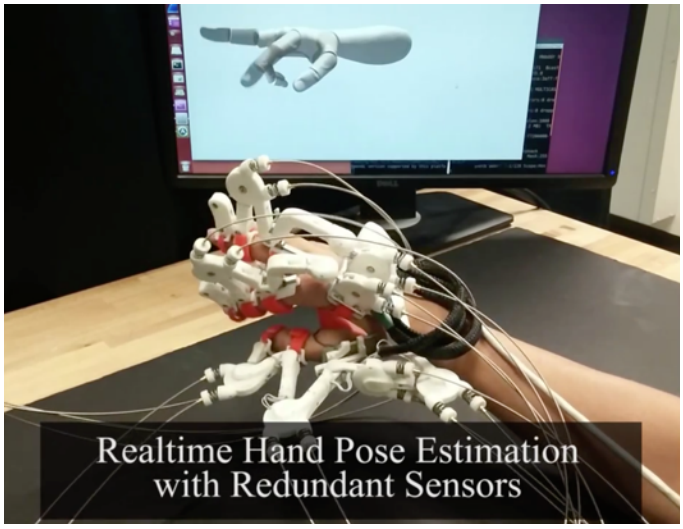


Hand Visualization Project | 2015

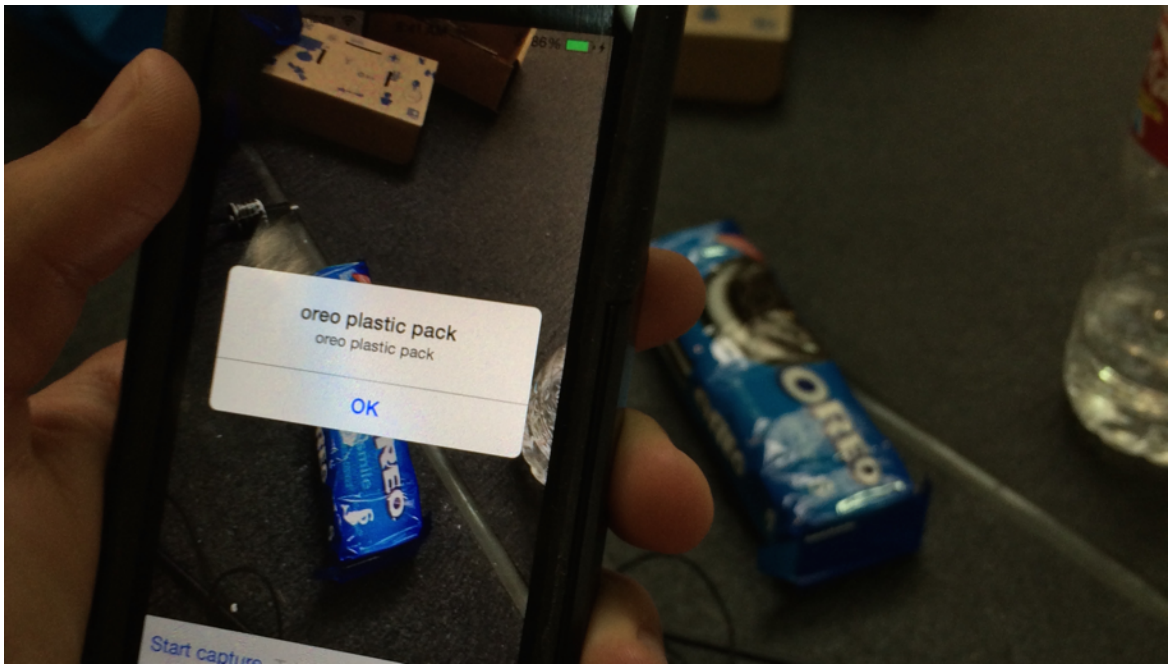




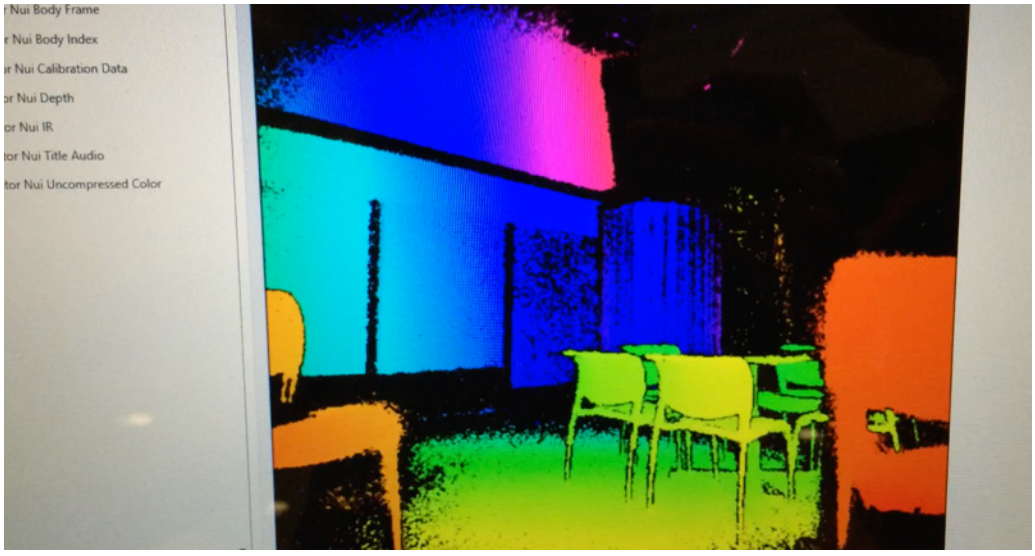
A realtime, 3D rendering program for visualizing hand motion under a robotic exoskeleton. This program communicates over the Internet with the robotic exoskeleton to visualize hand kinematics, as well as torques being applied at each joint. Program was written from scratch with OpenGL and C++.



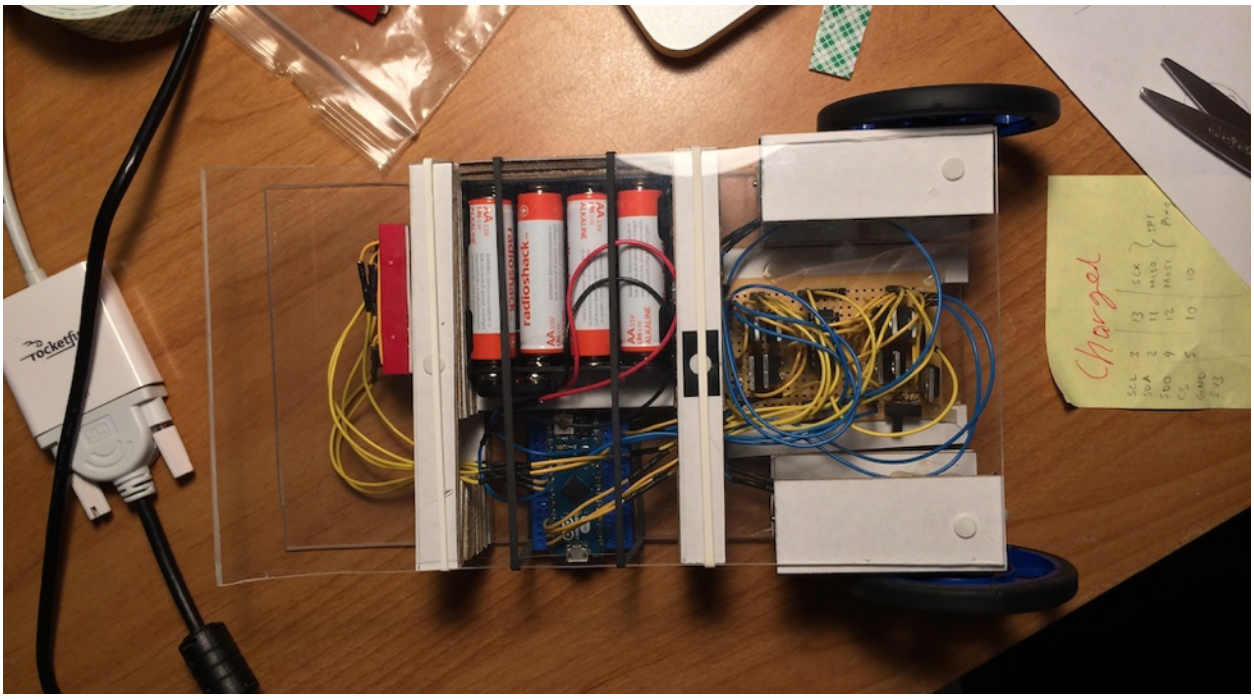
HackTX: Hardware + Software Toolkit (Top 10 Finalist) | October 2014



A toolkit for helping visually impaired people perceive their surroundings. Toolkit consists of 2 iPhone apps, and a hardware ultrasonic sensor for detecting obstacles at close proximity. One of the apps creates a depth map of the environment using a Microsoft Kinect and relays that information to the user's phone, where the phone's vibrator then provides haptic feedback regarding the general layout of the room. The second app utilizes an image recognition API to display and speak a description of an object in front of the user's camera.



Self-Balancing Robot | Summer 2014



A self-balancing robot built over the summer of 2014. It consists of two DC motors driven by an H-Bridge, 8 AA batteries, an accelerometer, a gyroscope, and an Arduino Micro. Although everything functioned, upright stability was not achieved for more than a few seconds due to the clock speed of the Arduino, and the high torque ratio on the motors which slowed down their response. The structure was constructed with scrap acrylic sheets and cardboard cutouts.