

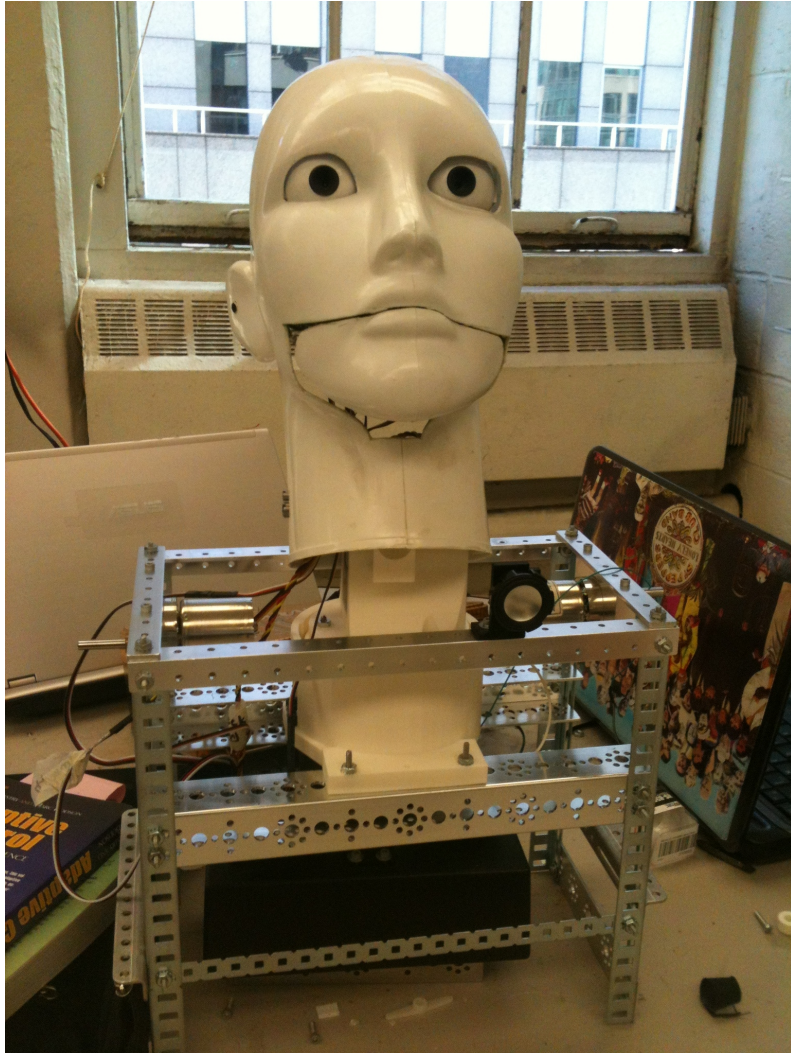
## **Design and Function of Robot-Head, A Humanoid Robot**

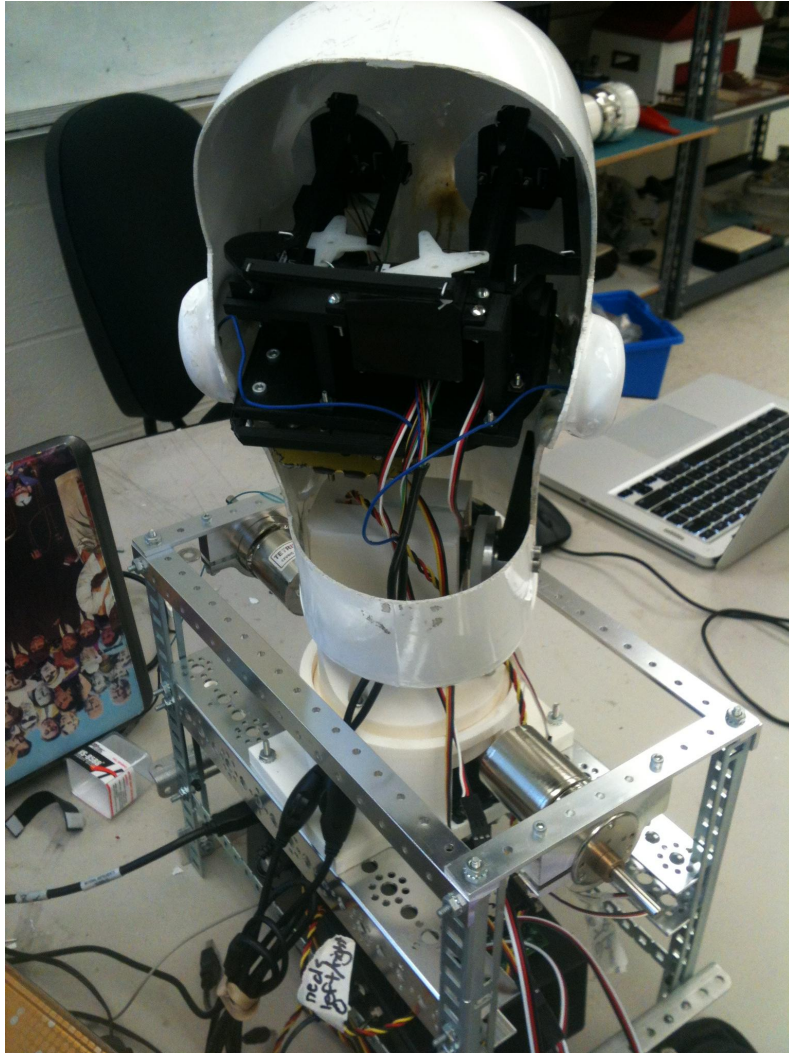
Alexa Goldstrom and Zulficar Habib

### **Research**

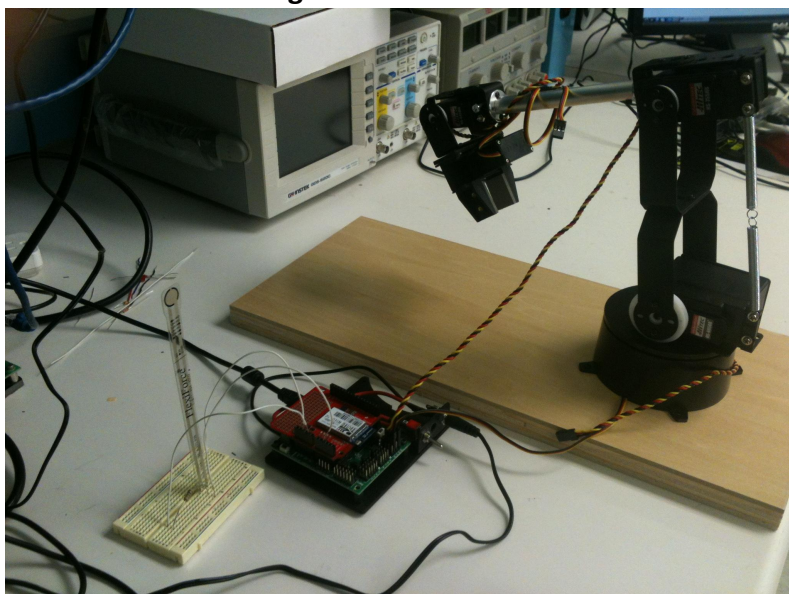
**Title:** Design and Function of Robot-Head, A Humanoid Robot

Our research concentrated on the design and development of the humanoid robot, Robot-Head. Numerous people are contributing to this project—some on the design, some on the hardware, and others on the software. Alexa worked with the team that is using 3D software and 3D printers to design Robot-Head's body parts. Specifically, she researched on the design of Robot-Head's neck, which will be biomimetic (mimic a human neck), however it will only have two degrees of freedom. Her research provided an overview of the human neck structure, other robotic neck designs, 3D software options, and the process for the development of current prototype of Robot-Head's neck. Not only will Robot-Head's neck imitate a human neck, it will eventually be covered with a synthetic skin with sensors to look and act more human like, which is unique to robots since other robots have necks with exposed motors, gears, and supports. Zulficar explored ways to securely use Android apps, java programming language, public-key and secret-key encryption/decryption, Arduino's microcontroller, and the programming language used by Arduino to communicate and control robotic actions analogous to how sensory receptors in the human skin respond to the sensation of pain, heat, touch, pressure, vibration, and stress. Specifically, he evaluated a pressure sensor with a robotic arm. Eventually, his research will impact the use of synthetic skin and limb functionality of Robot-Head.





**Robot-Head's 3D designed neck mounted to the chest and head**



**Illustration of 3 DOF robotic manipulator**

