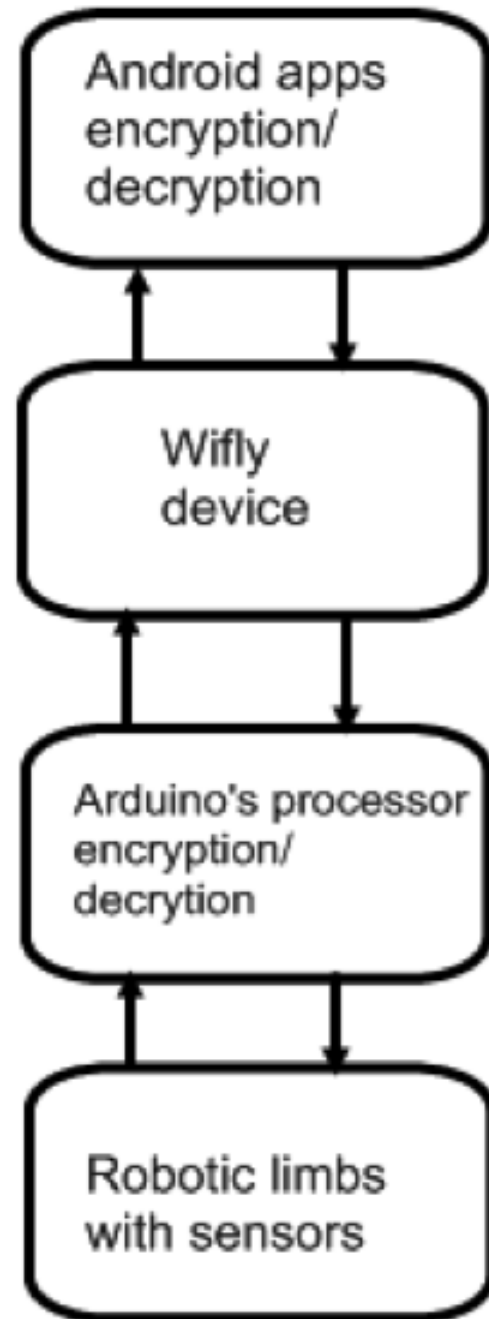




CAESAR, the Humanoid Robot

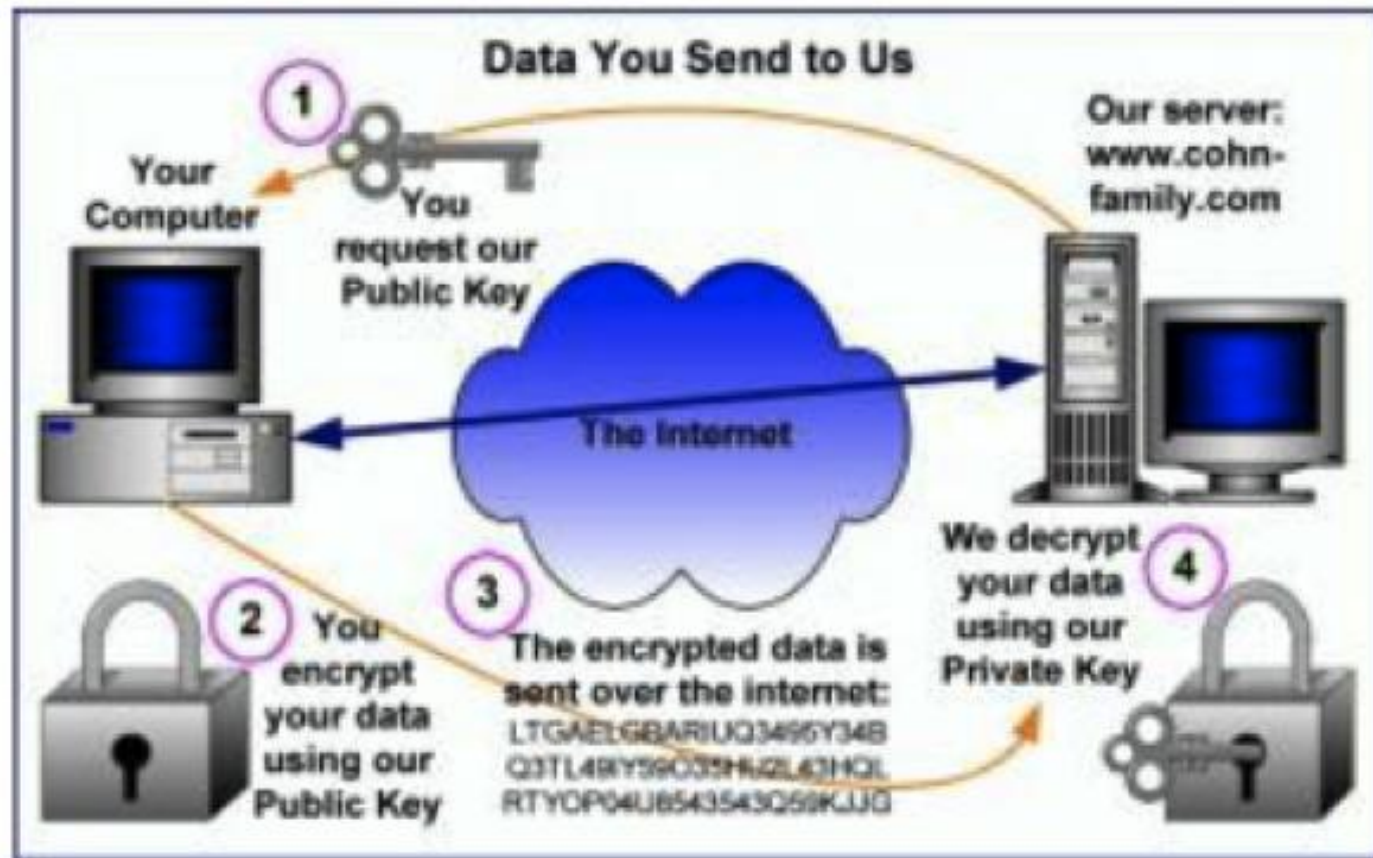
Alexa Goldstrom and
Zulficar Habib
Mechatronics Lab,
NYU POLY
Summer 2013

Flowchart
of packet
sending
from
Android
device to
the robot
limb.



Flow chart of how public-key encrypts/decrypts data

Image Credit: <http://itgs.wikispaces.com/>



How DES encrypts/decrypts data

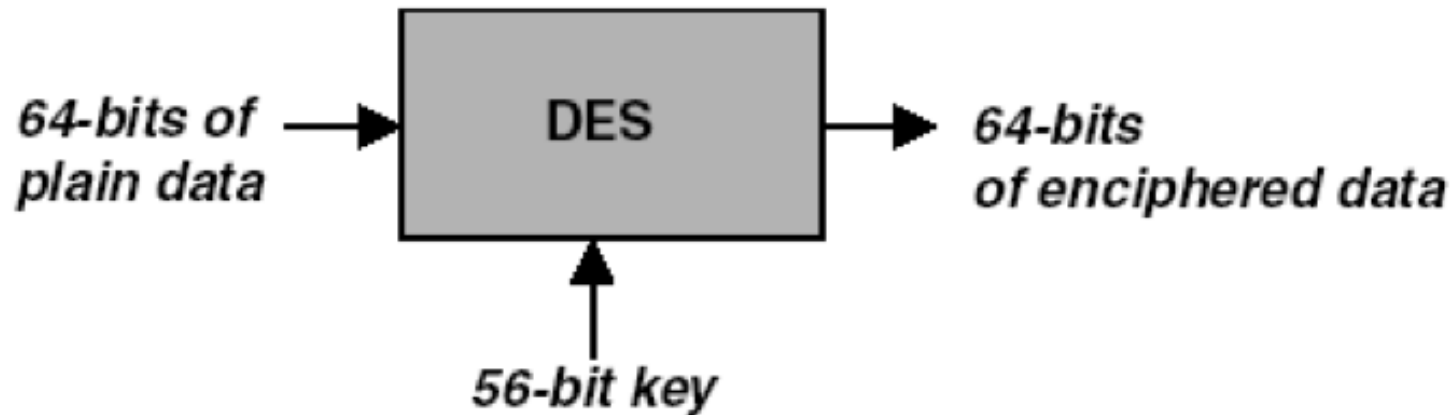
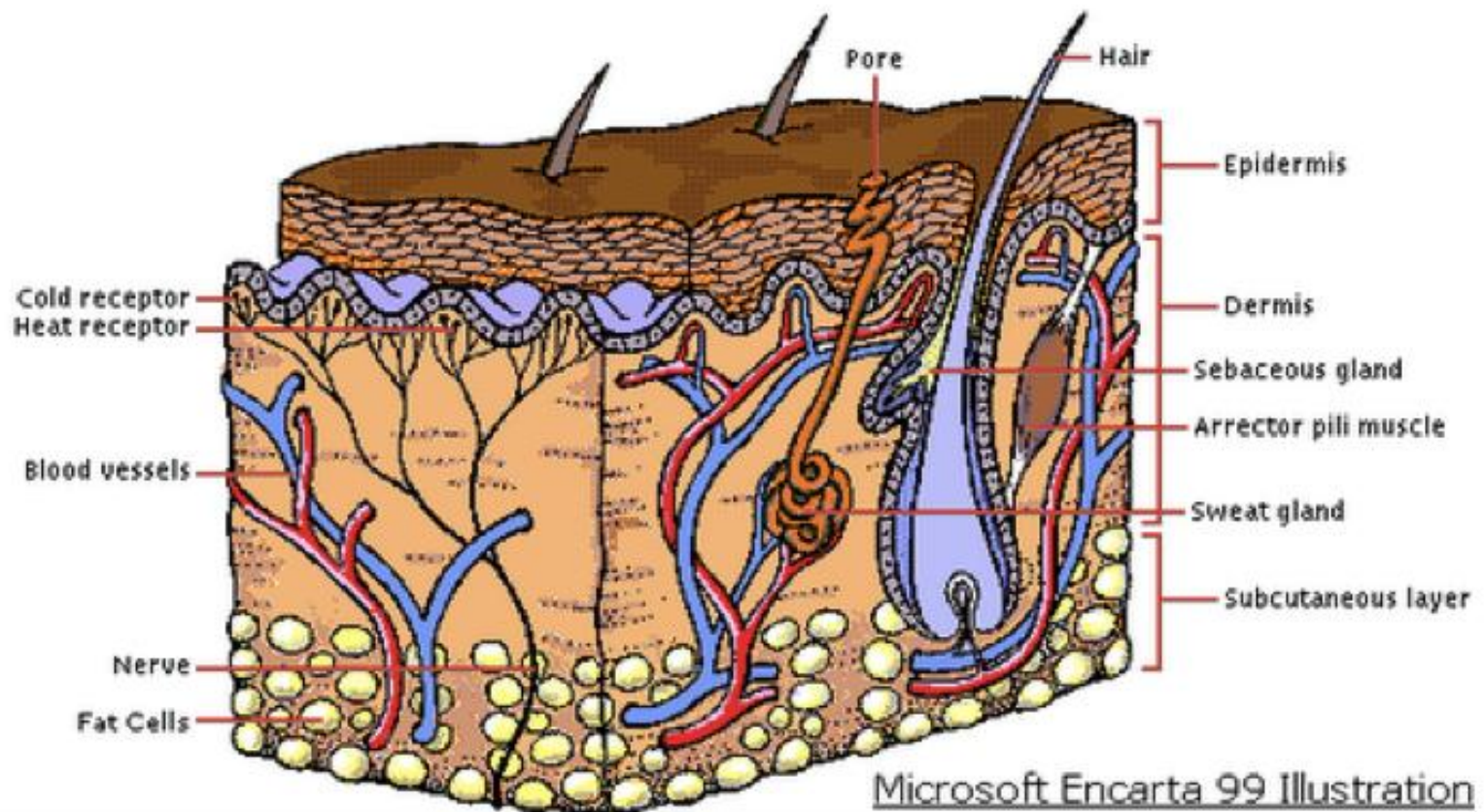
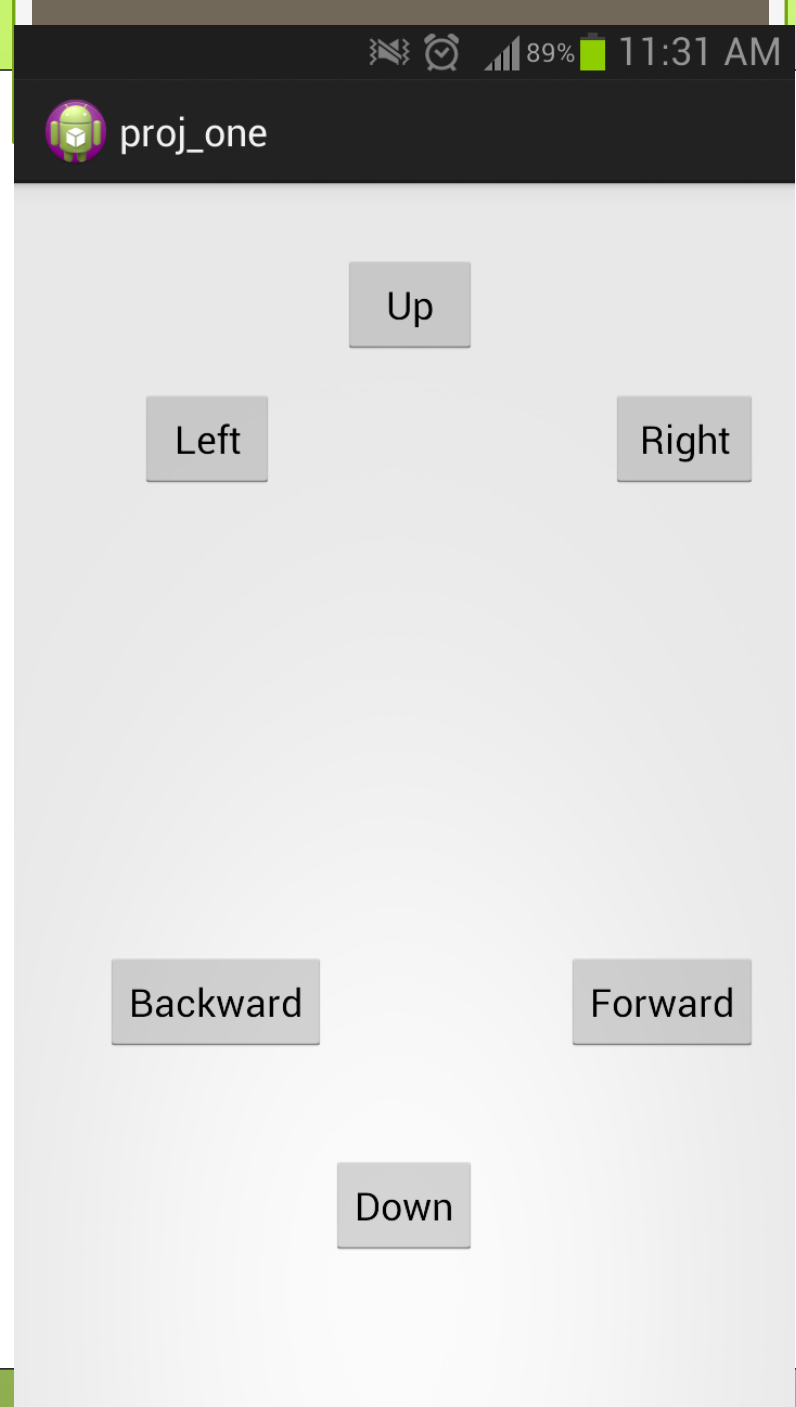


image credit to: <http://www.informit.com>

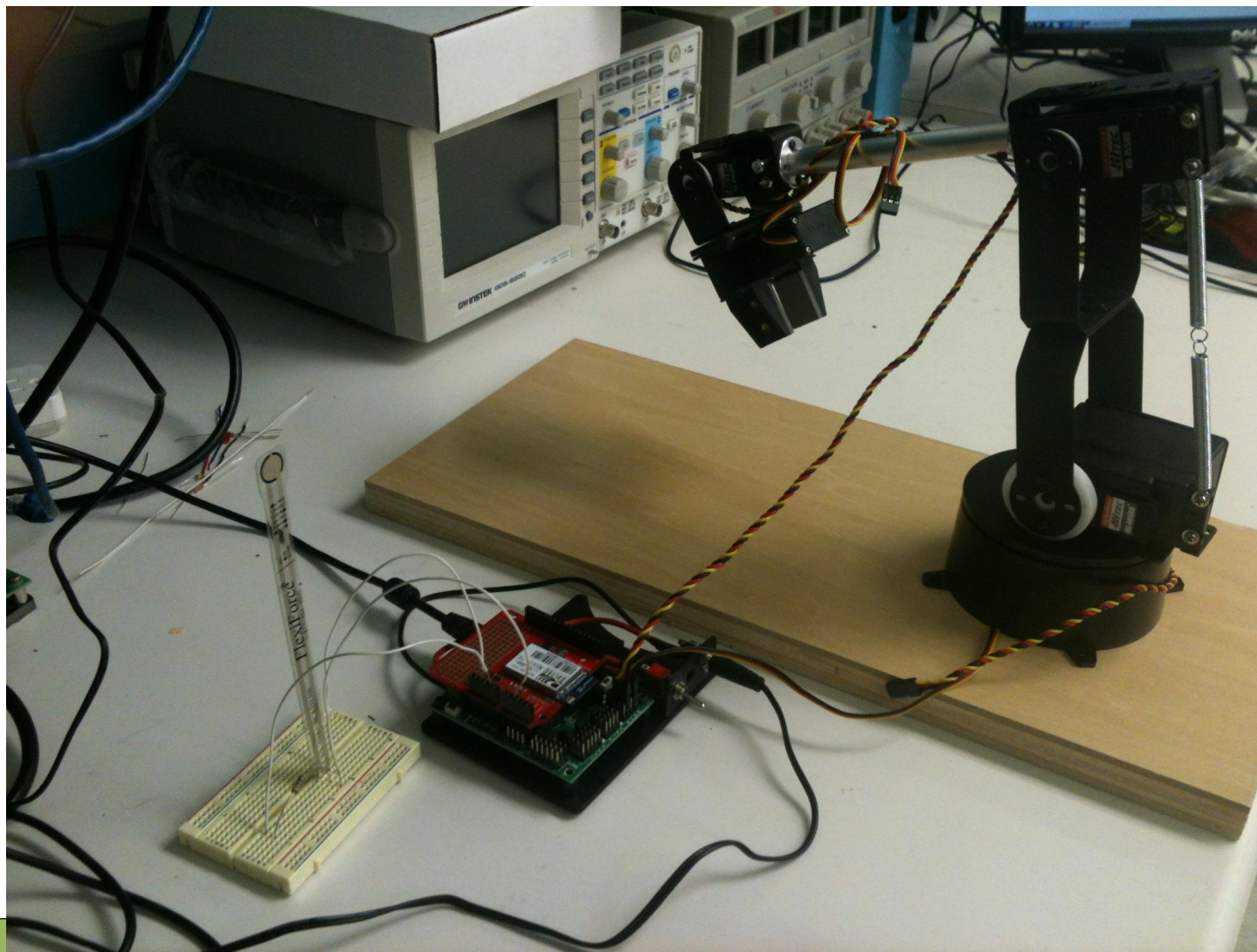
Cross section of the human skin



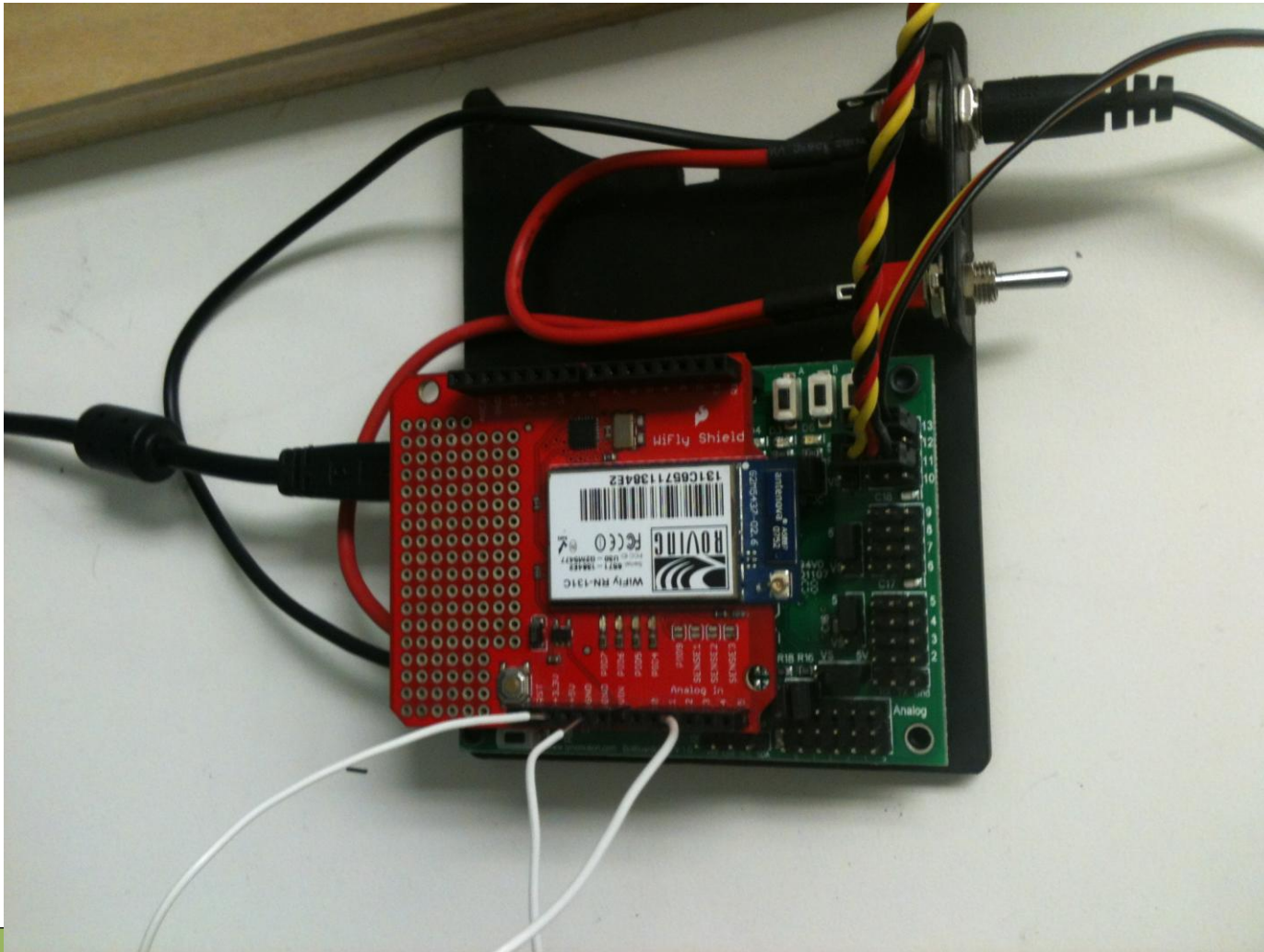
Android App



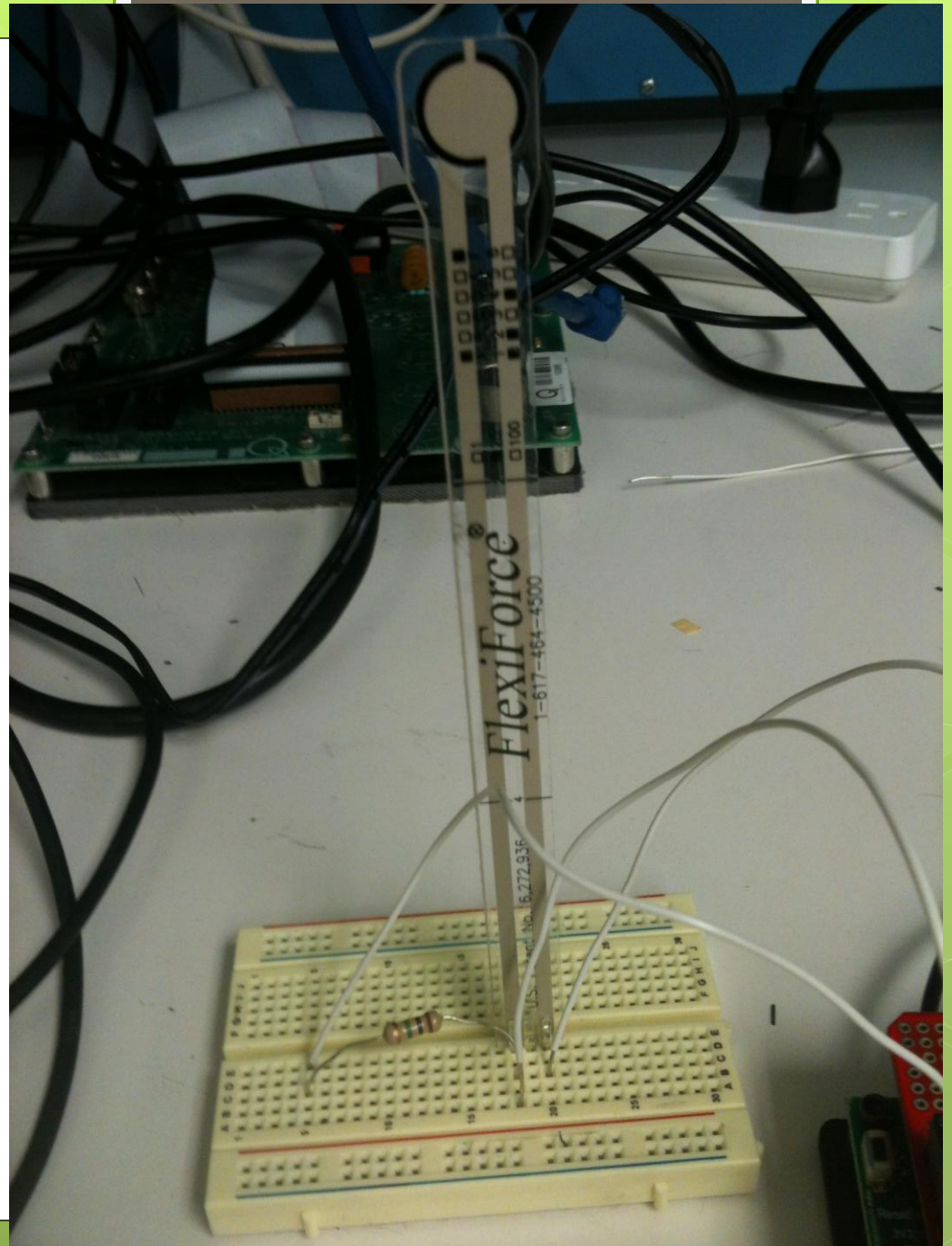
Robotic Arm



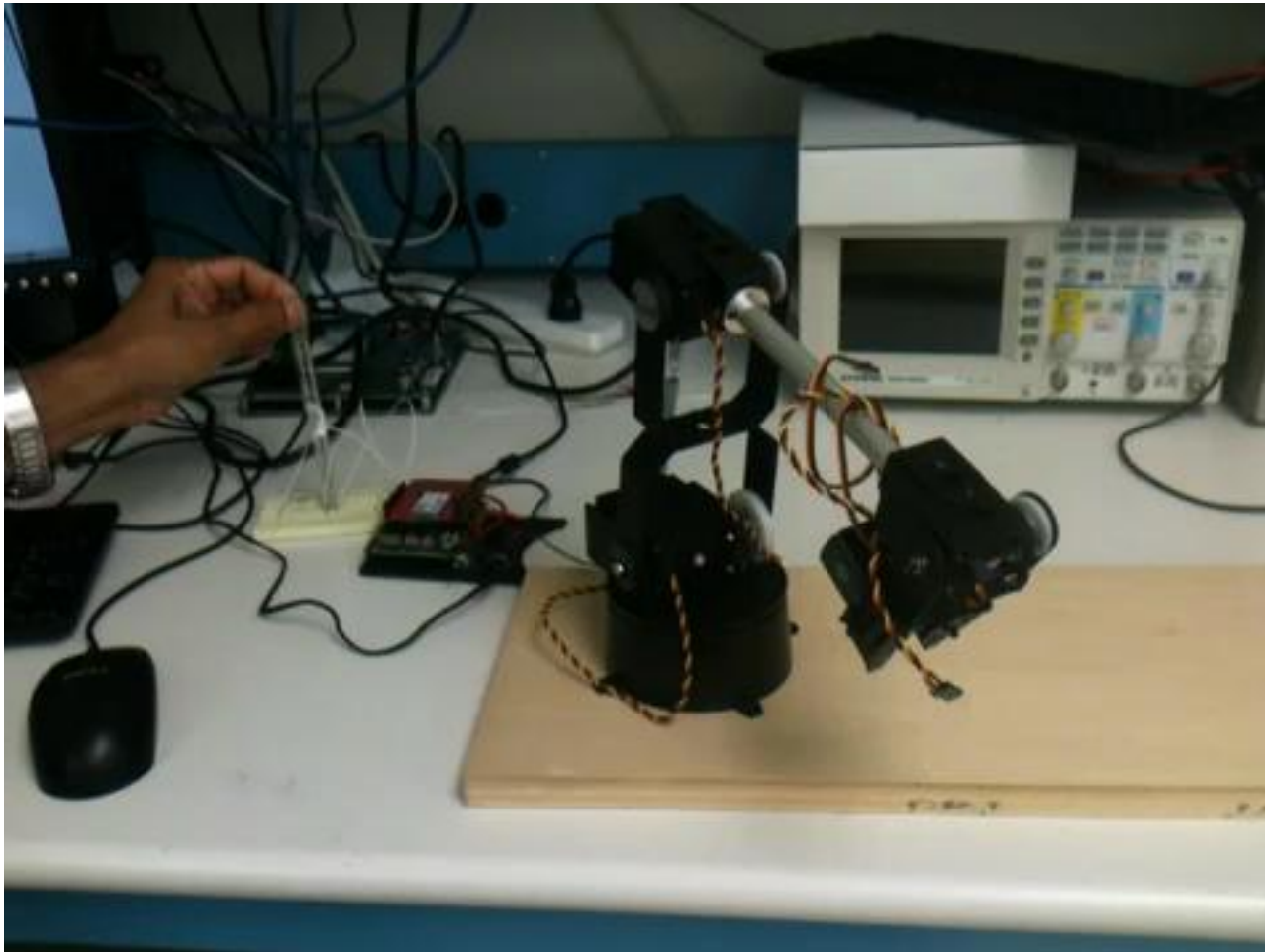
Arduino board with Wifly Shield



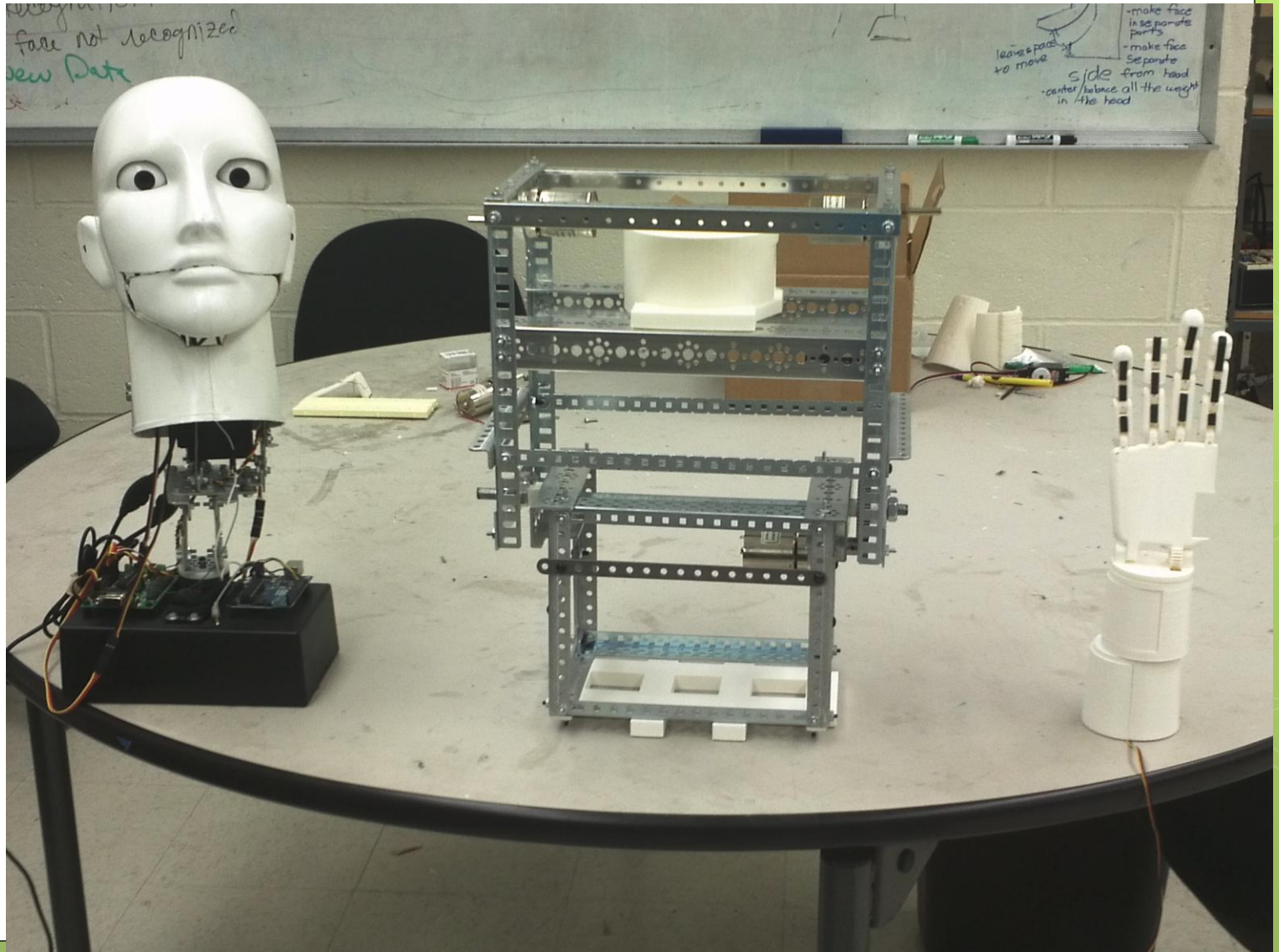
Flexiforce Sensor



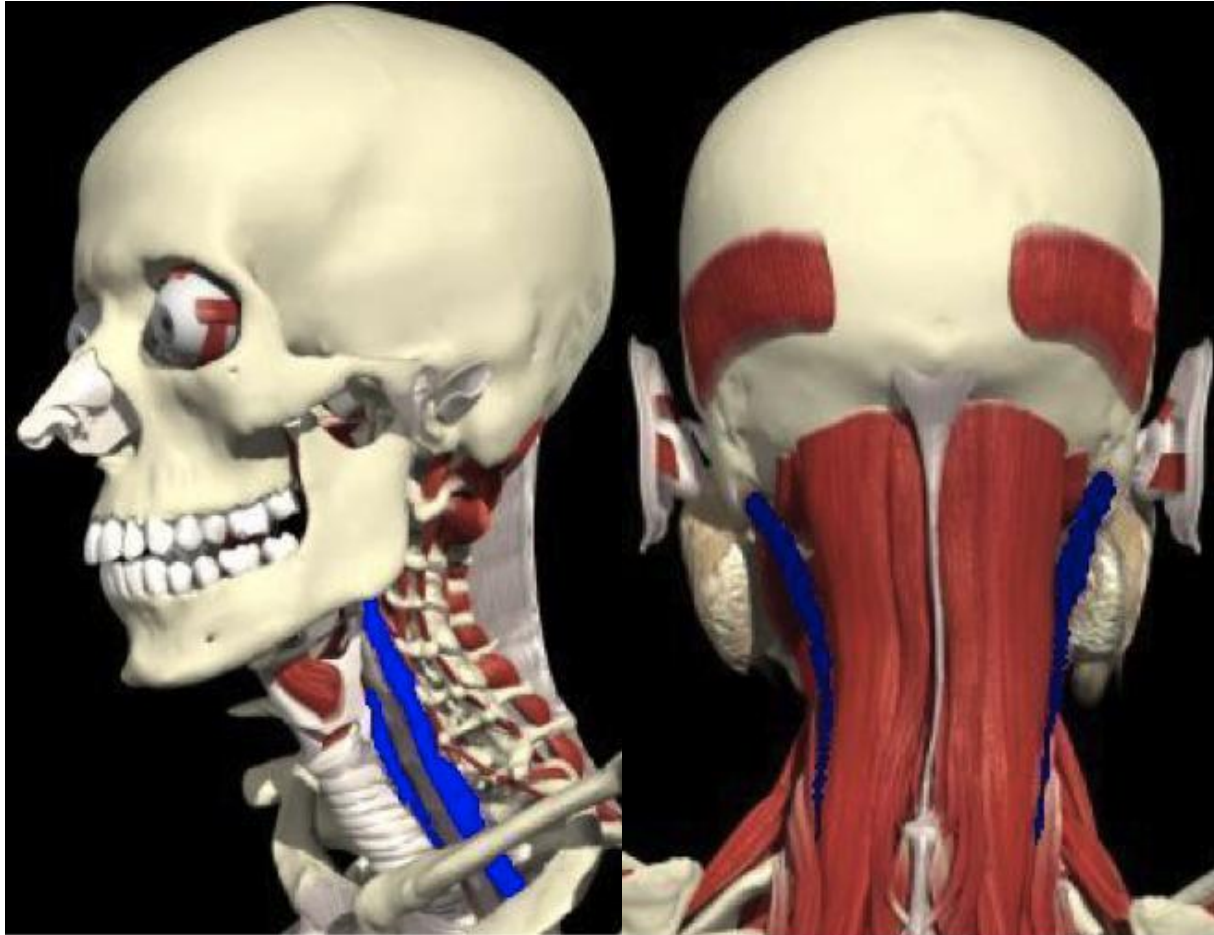
Robotic Arm in Action



CAESAR

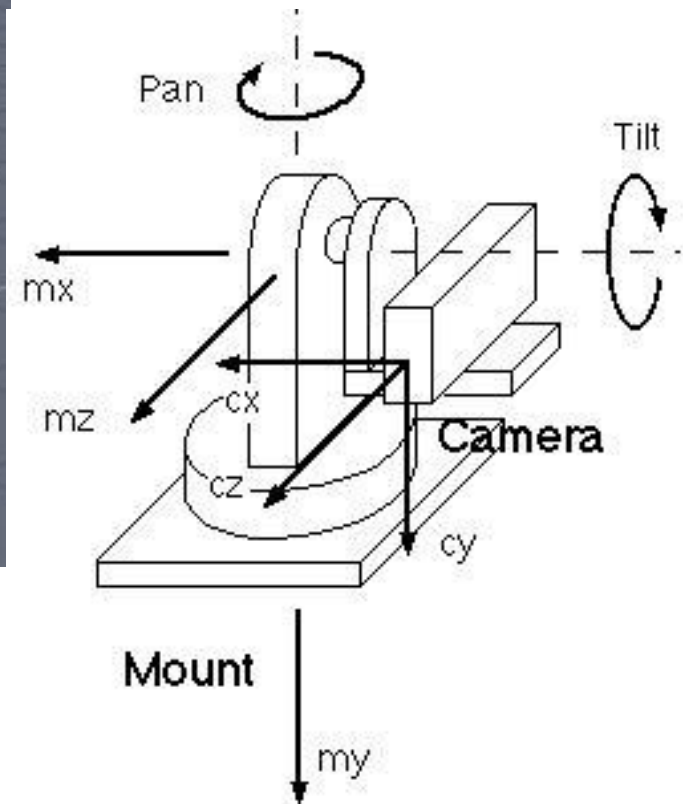
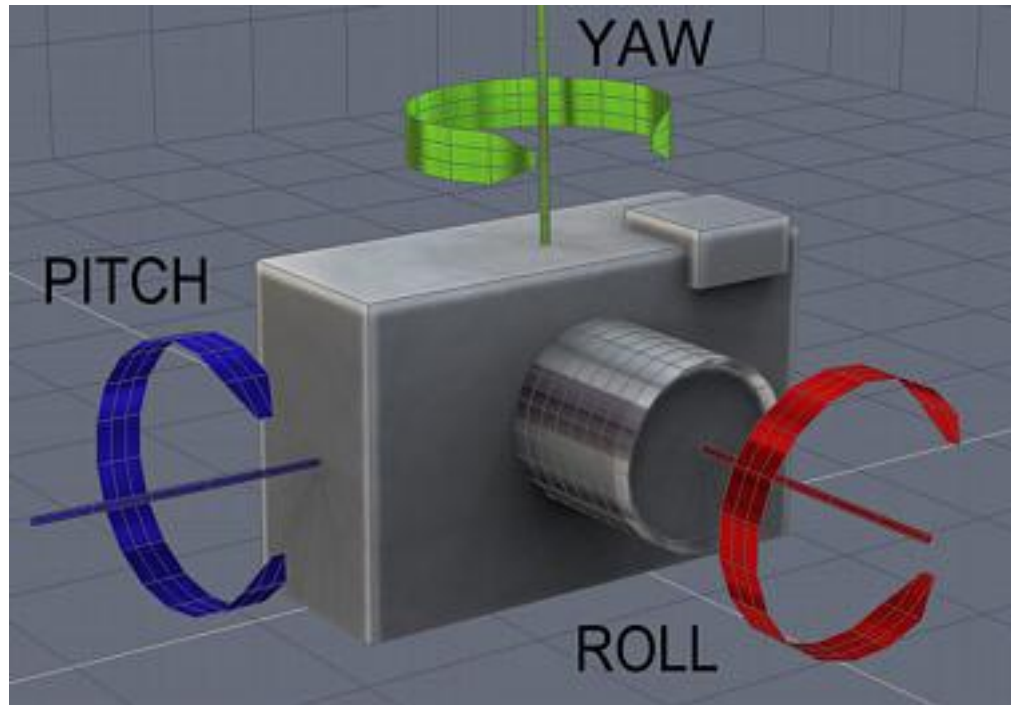


Human Neck

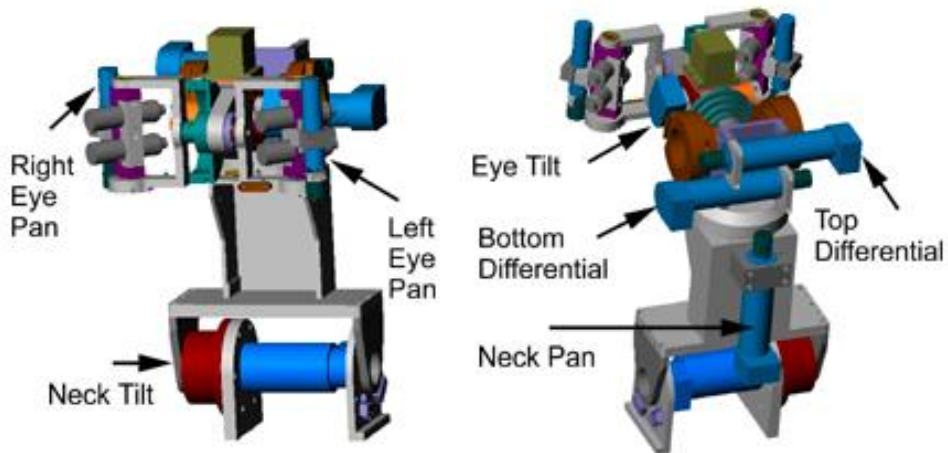


The human neck has 4 degrees of freedom.

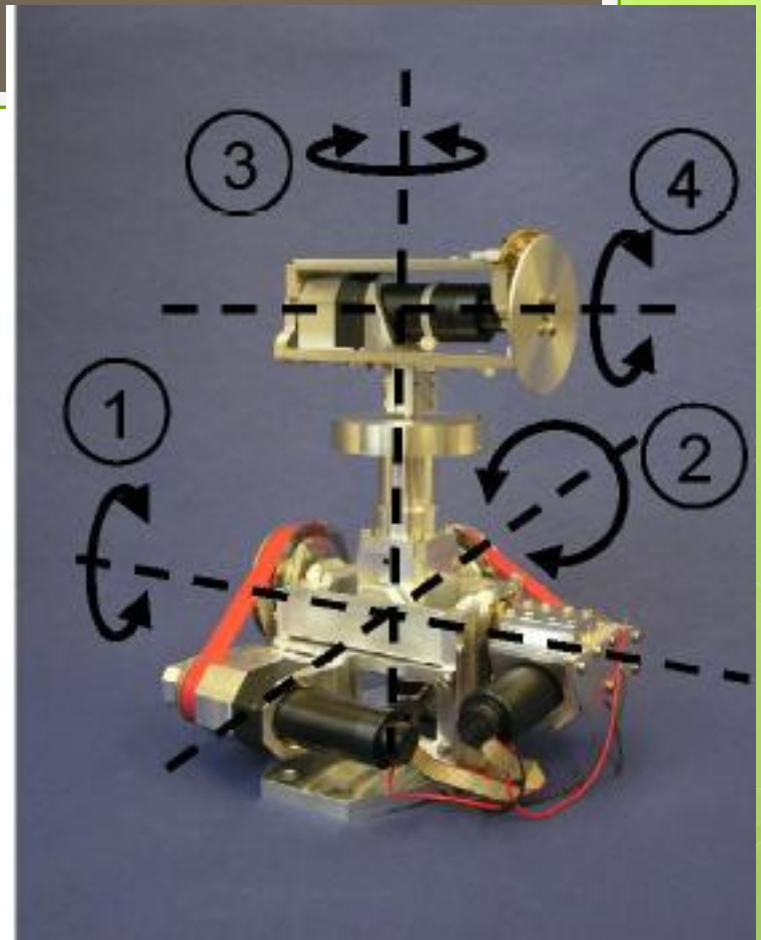
Degrees of Freedom



Robots with 4 DOFs



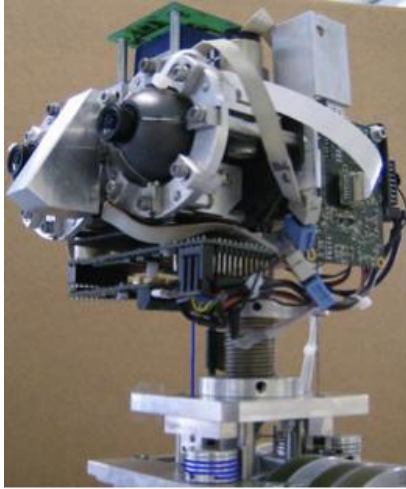
Cog (MIT)



ARMAR III

Humanoid Robot
(Albers & Brudniok, 2005)

Robots with 3 DOFs



James

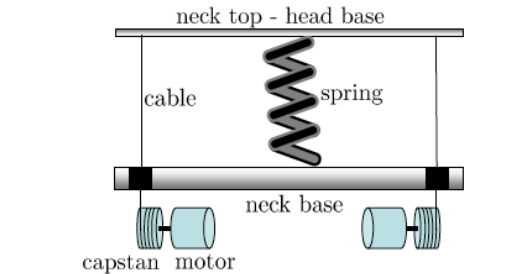


Fig. 5. Two dimensional scheme of an actuation system similar to James's neck.

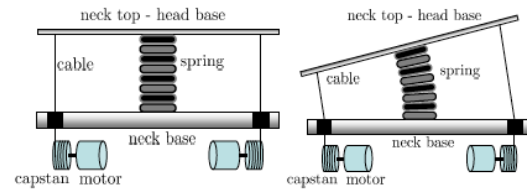


Fig. 6. Equivalent two dimensional scheme of james's neck.

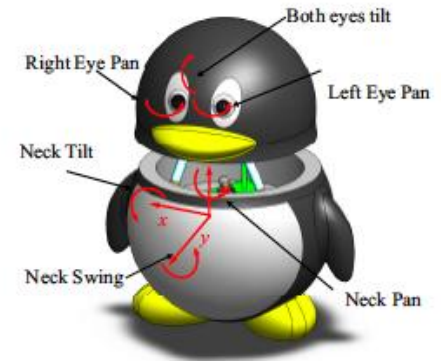


Fig. 1. A virtual prototype of the penguin robot with annotated degree of freedom.

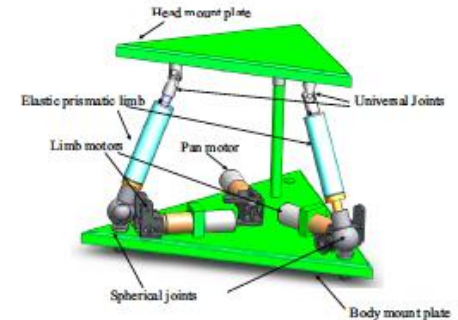
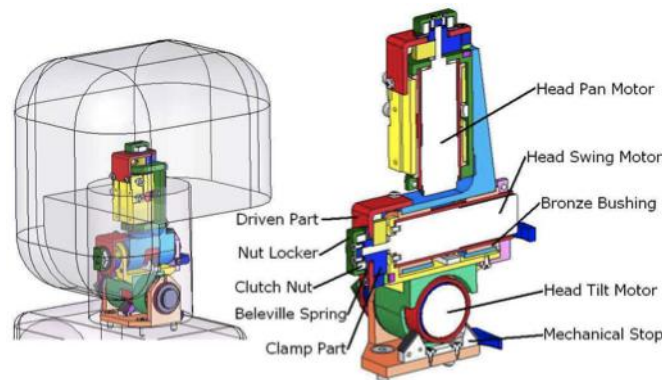
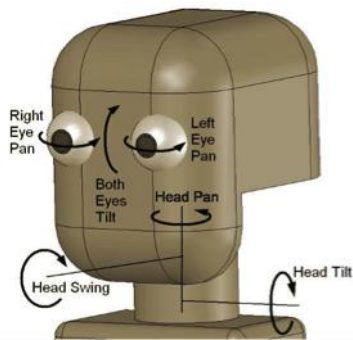


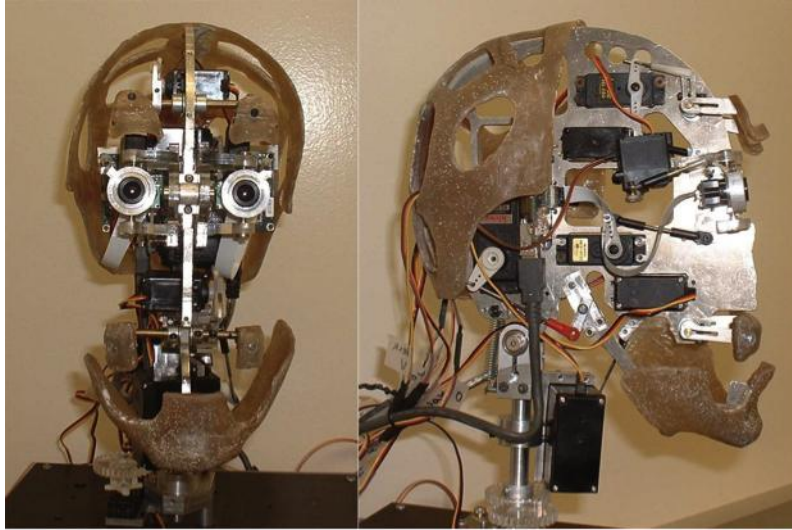
Fig. 2. A CAD rendering of the cable-driven parallel manipulator head.

Penguin Robot

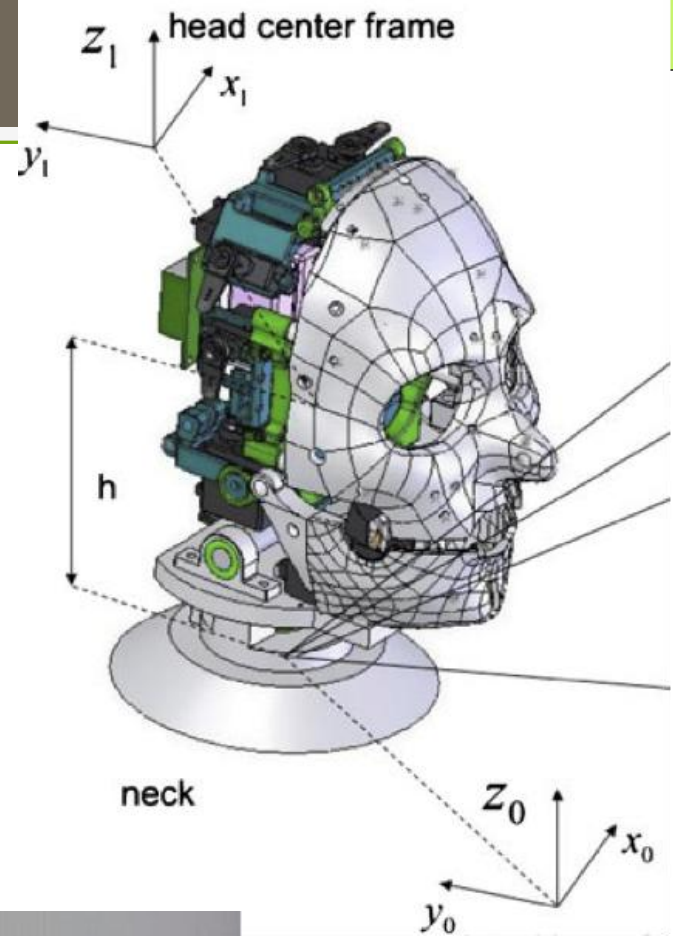
iCub



Robots with 2 DOFs



Anthropomorphic Robot



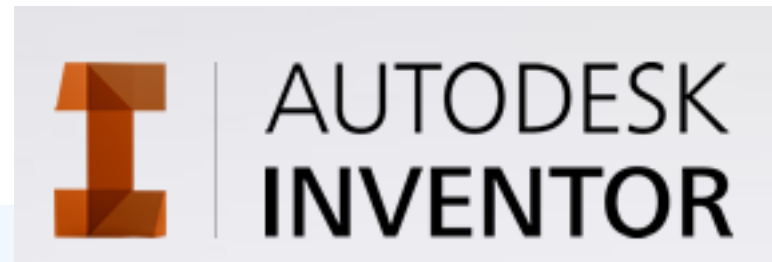
LILLY

Nancy

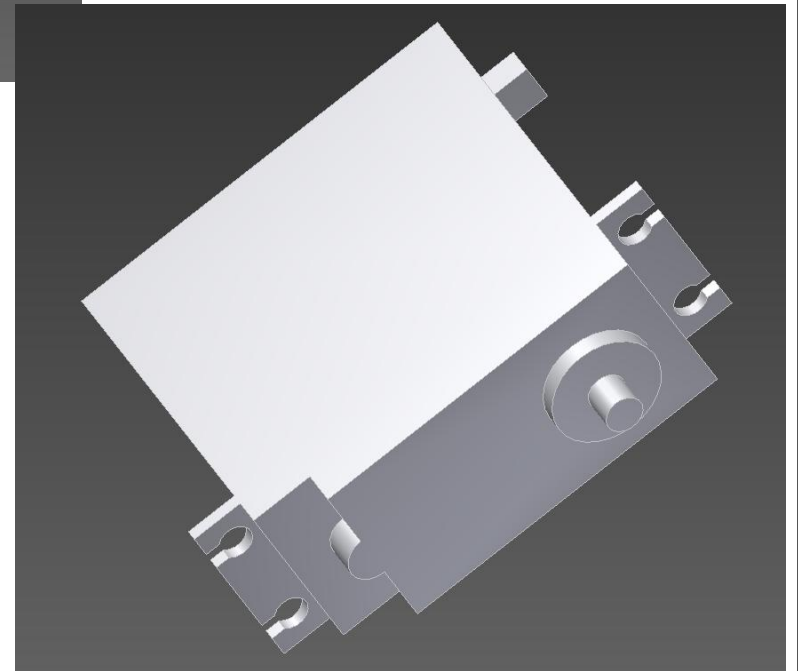
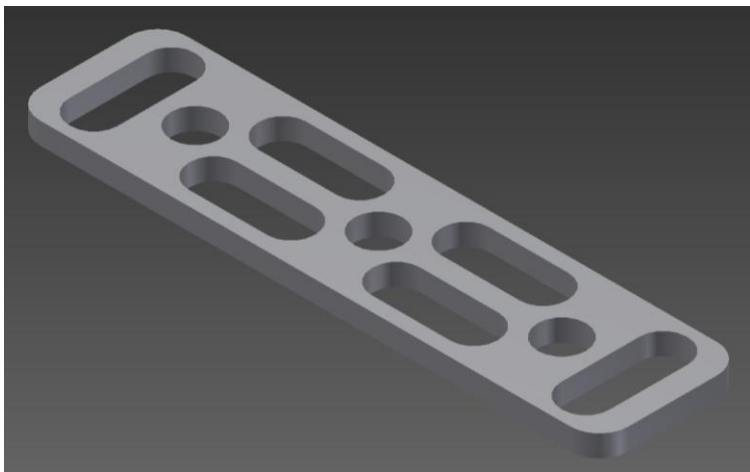
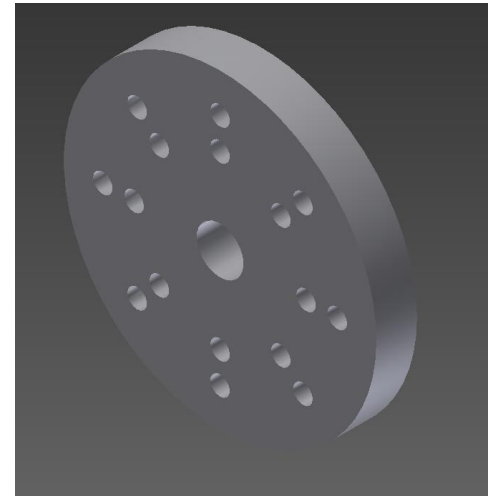
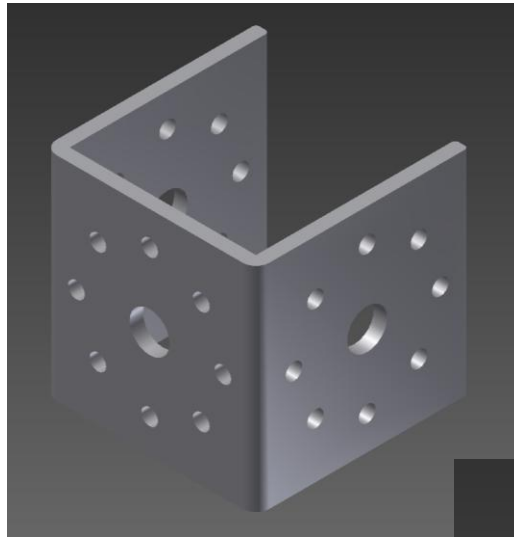
CAESAR's neck- before



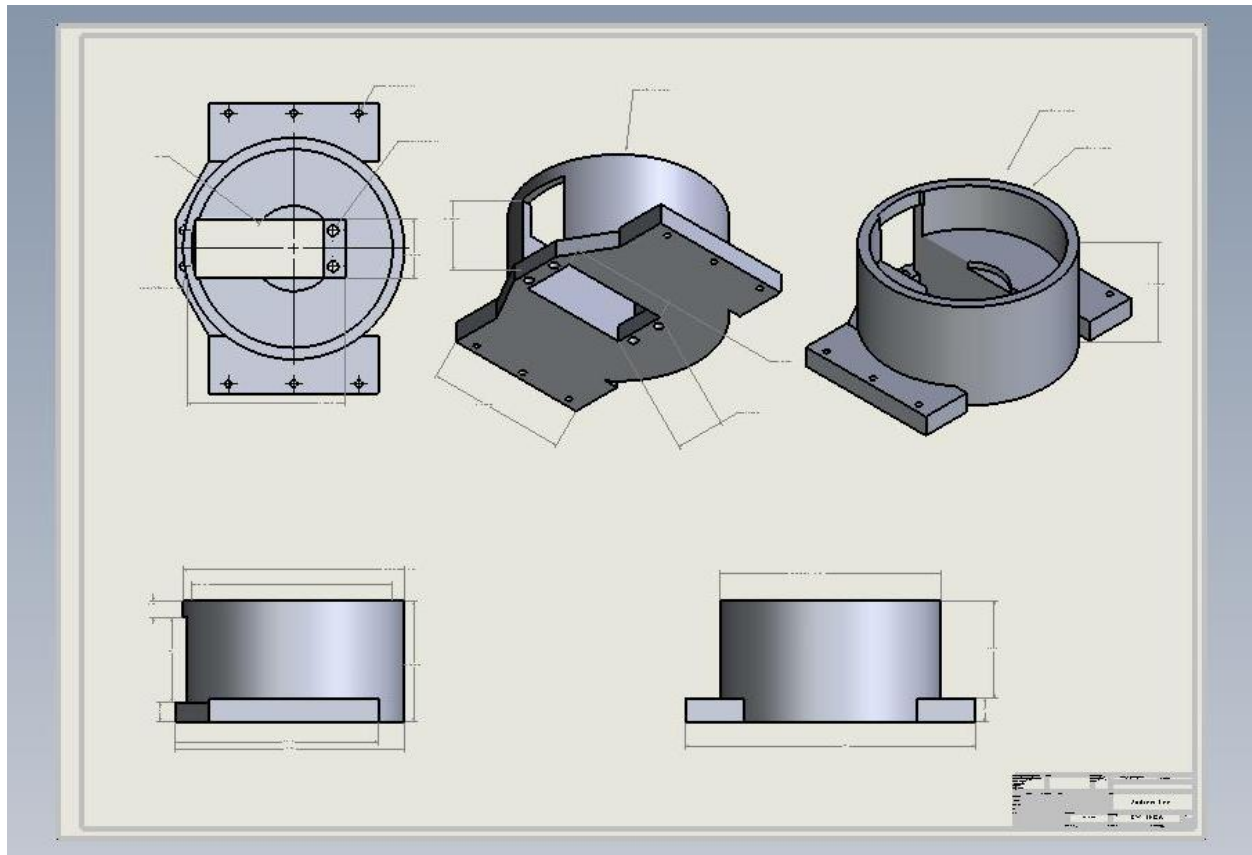
3D design options



Sample Images of My Designs

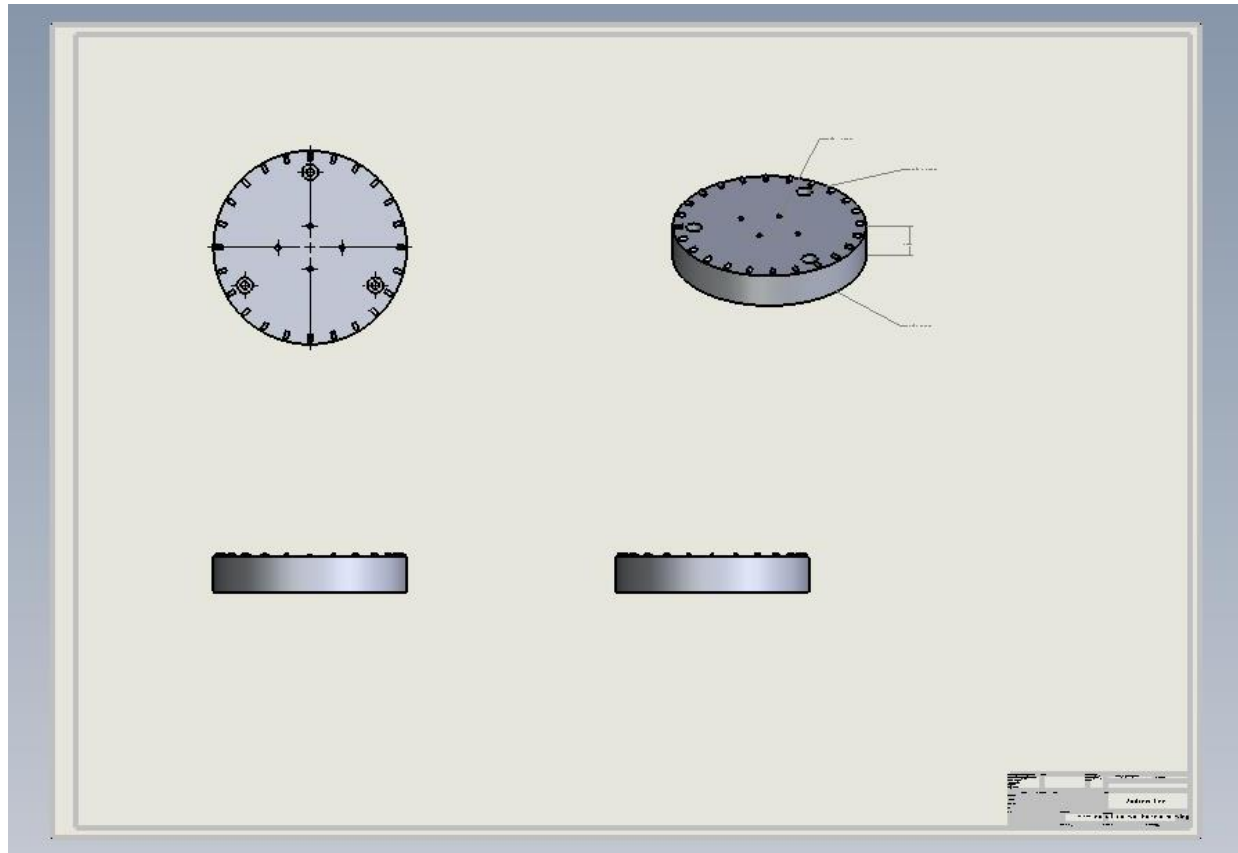


CAD models of 3D designed neck parts



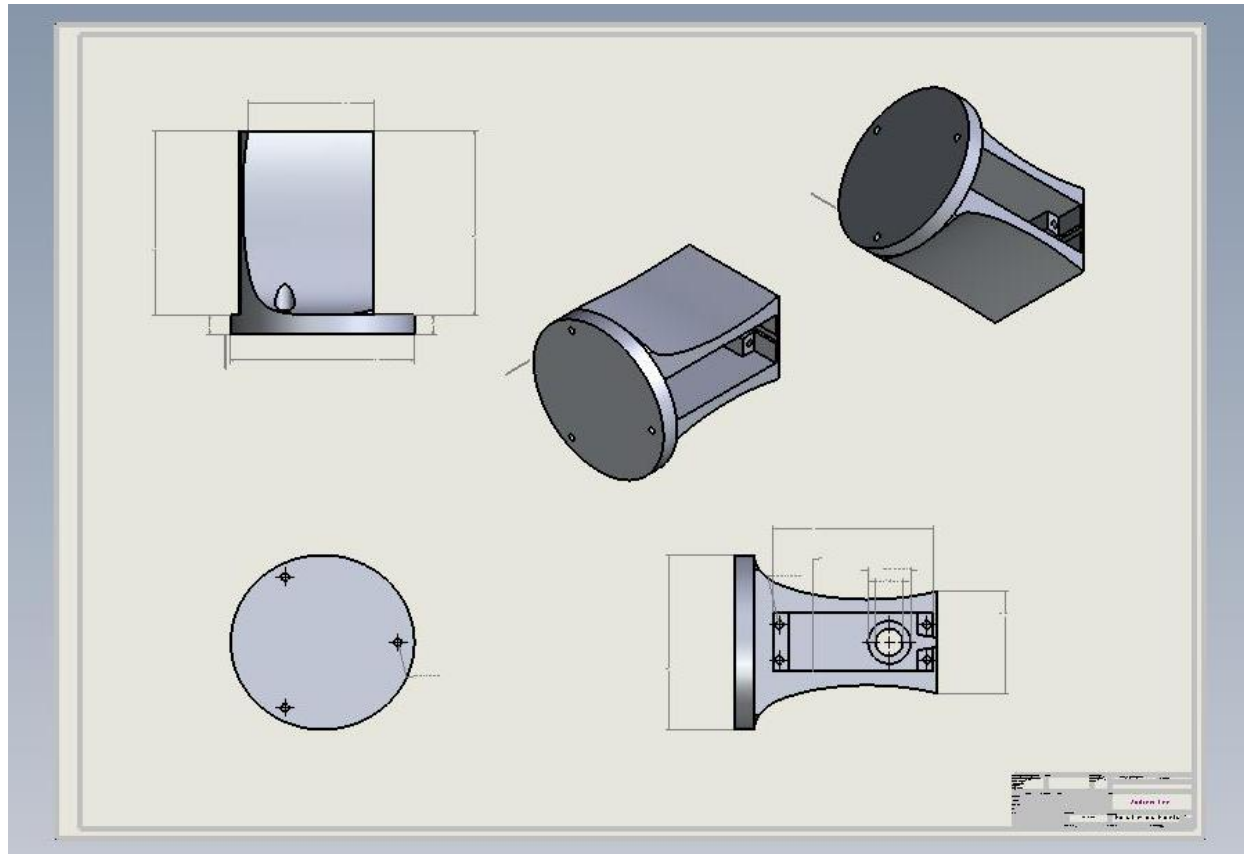
Base of neck, designed by Andrew Lee, drawn by Alexa Goldstrom

CAD models of 3D designed neck parts



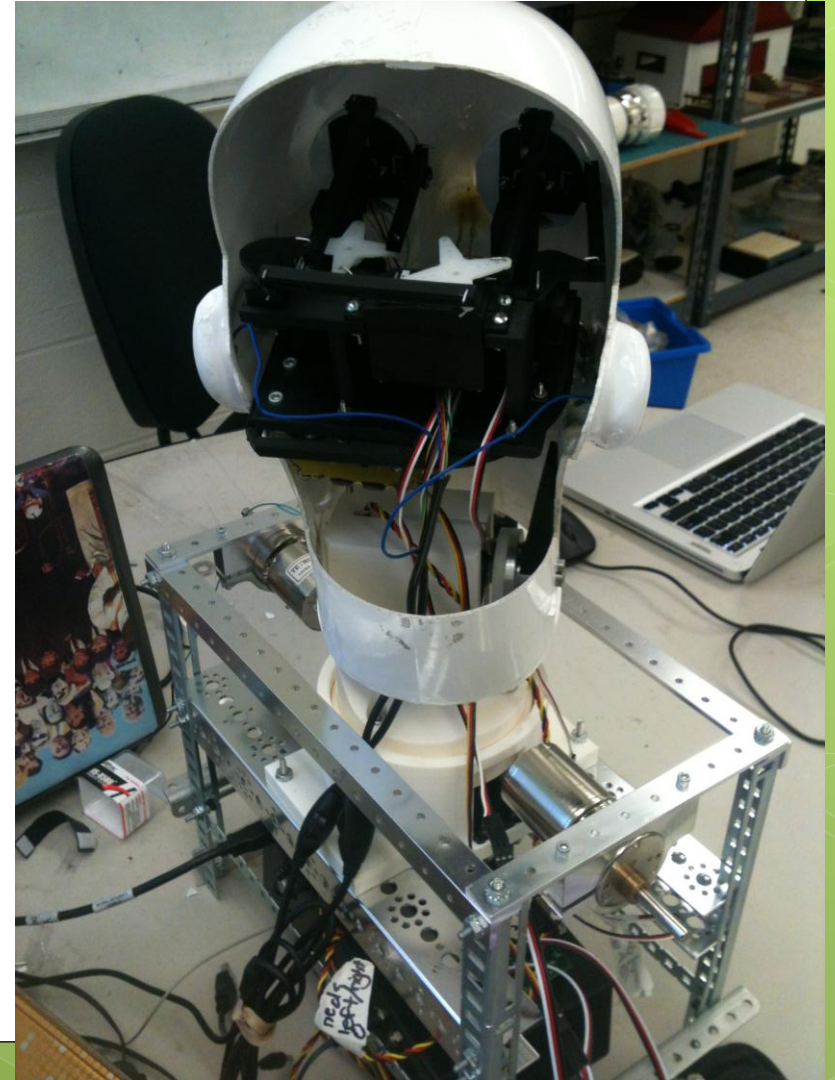
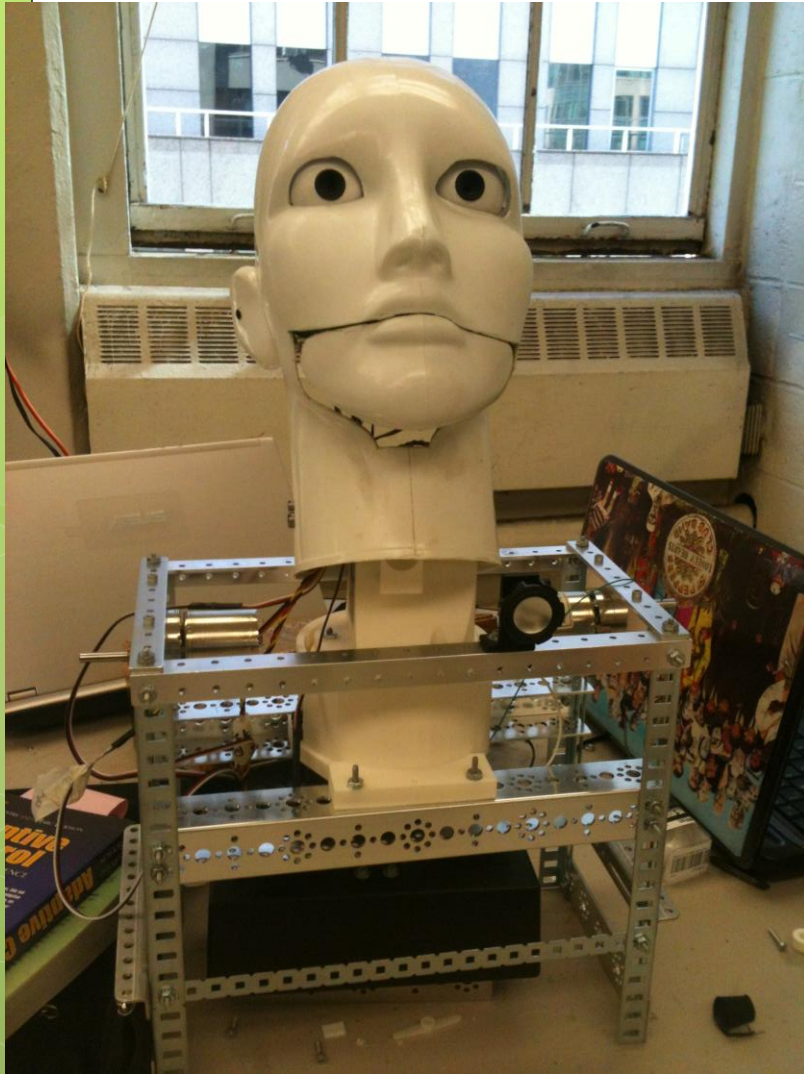
Servo-horn of neck, designed by Andrew Lee, drawn by Alexa Goldstrom

CAD models of 3D designed neck parts



Topof neck, designed by Andrew Lee, drawn by Alexa Goldstrom

CAESAR's neck- after



Business Possibilities

- Development of human-like skin with embedded sensors
- Use of 3D design software for modeling, proto-typing, marketing, etc.

Acknowledgements

- This work was supported by the National Science Foundation under grant EEC-1132482, "RET Site: Science and Mechatronics Aided Research for Teachers with an Entrepreneurship experience (SMARTER)."
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- SMARTER Teachers and ARISE students
- Mechatronics Lab Students