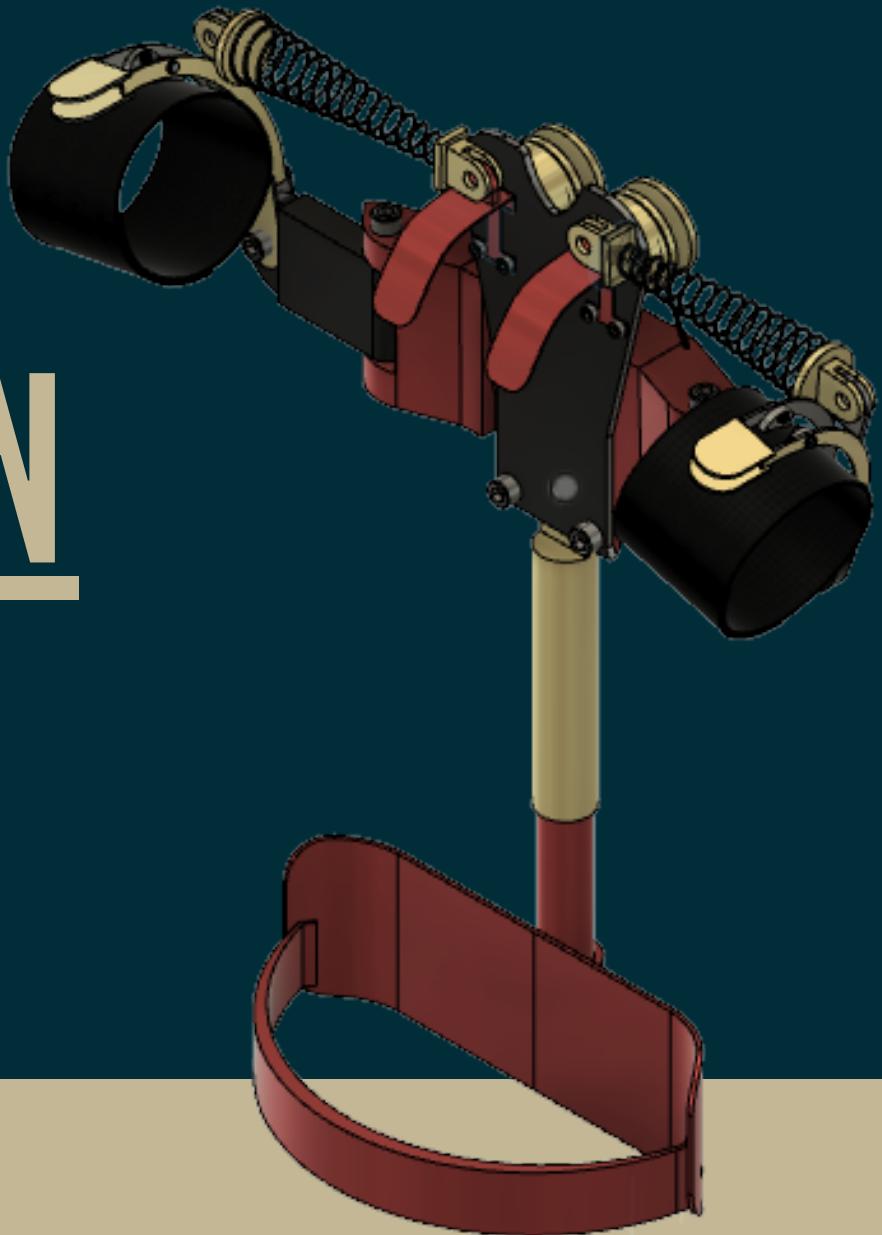


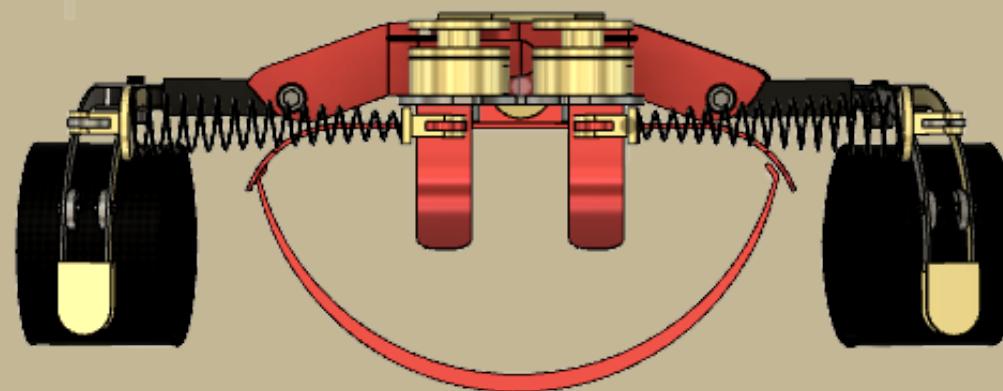
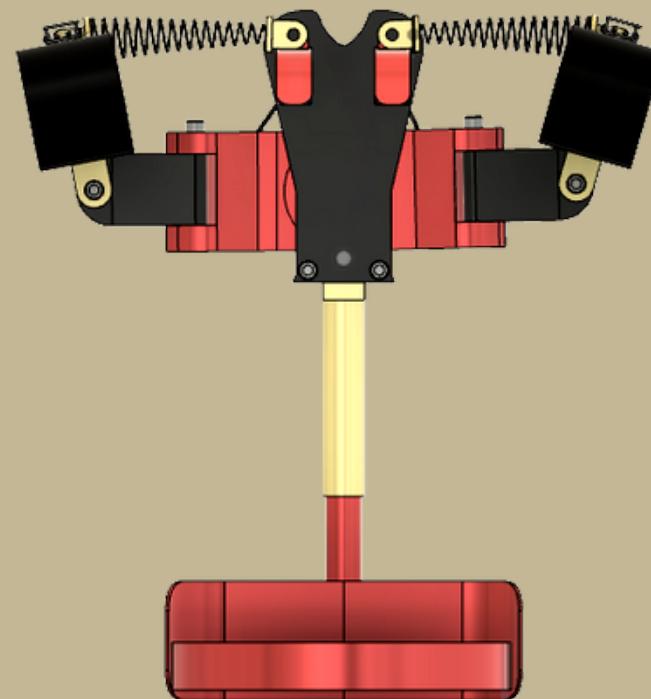
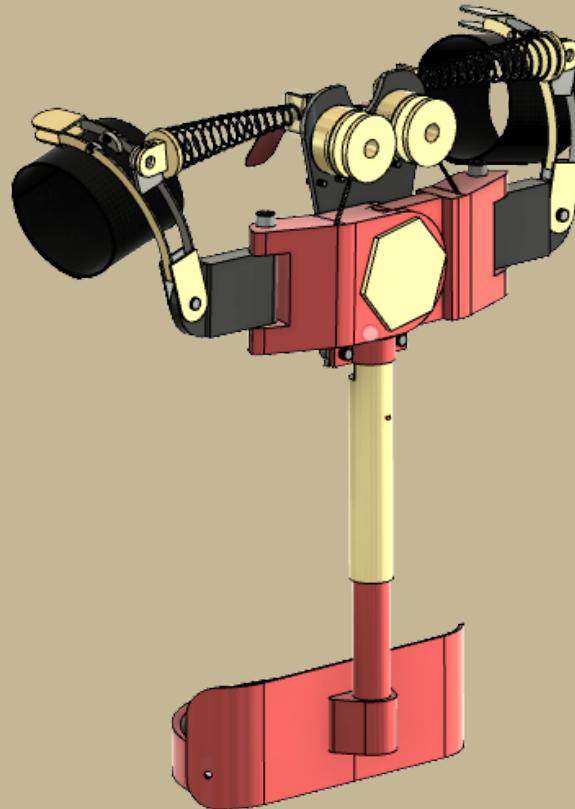


ROBOTICS CLUB
IIT Guwahati

EXOSKELETON

ROBOTICS PROJECT





OBJECTIVES

- Potentially reduce overuse injuries in industrial settings including overhead work or lifting tasks.
- Assistive exoskeleton does not need any power supply so can be used at will.



DESCRIPTION OF 3-DOF

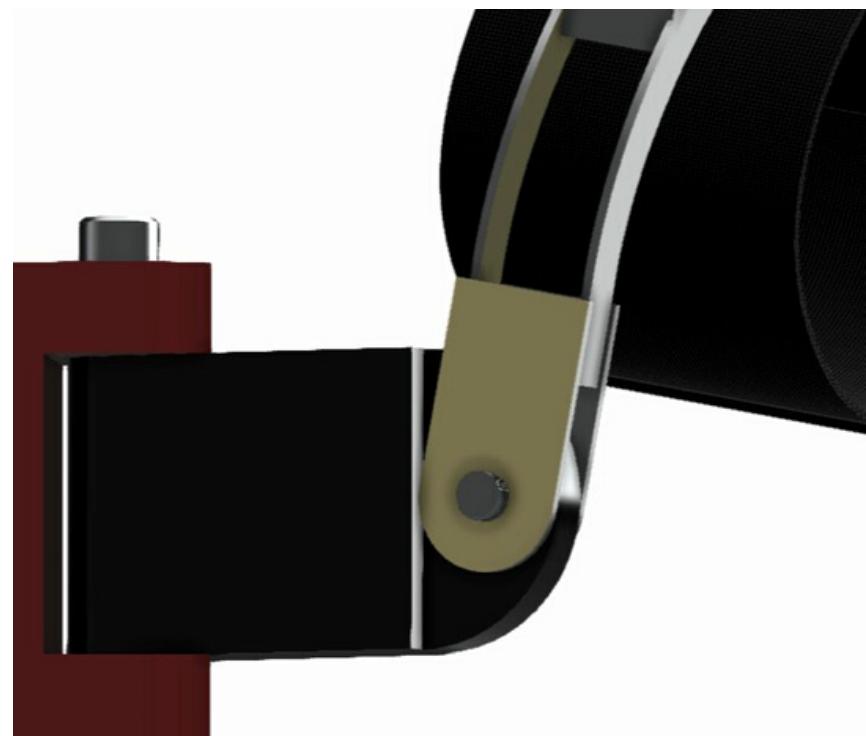
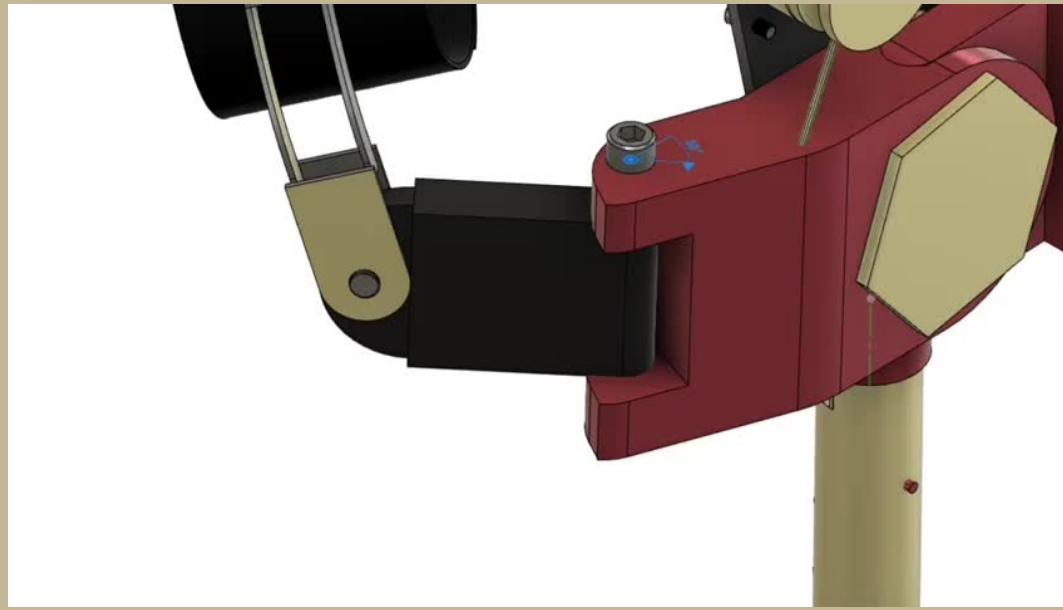
Three hinged joints - used to provide 3-DOFs required for the motion of the shoulder joint.

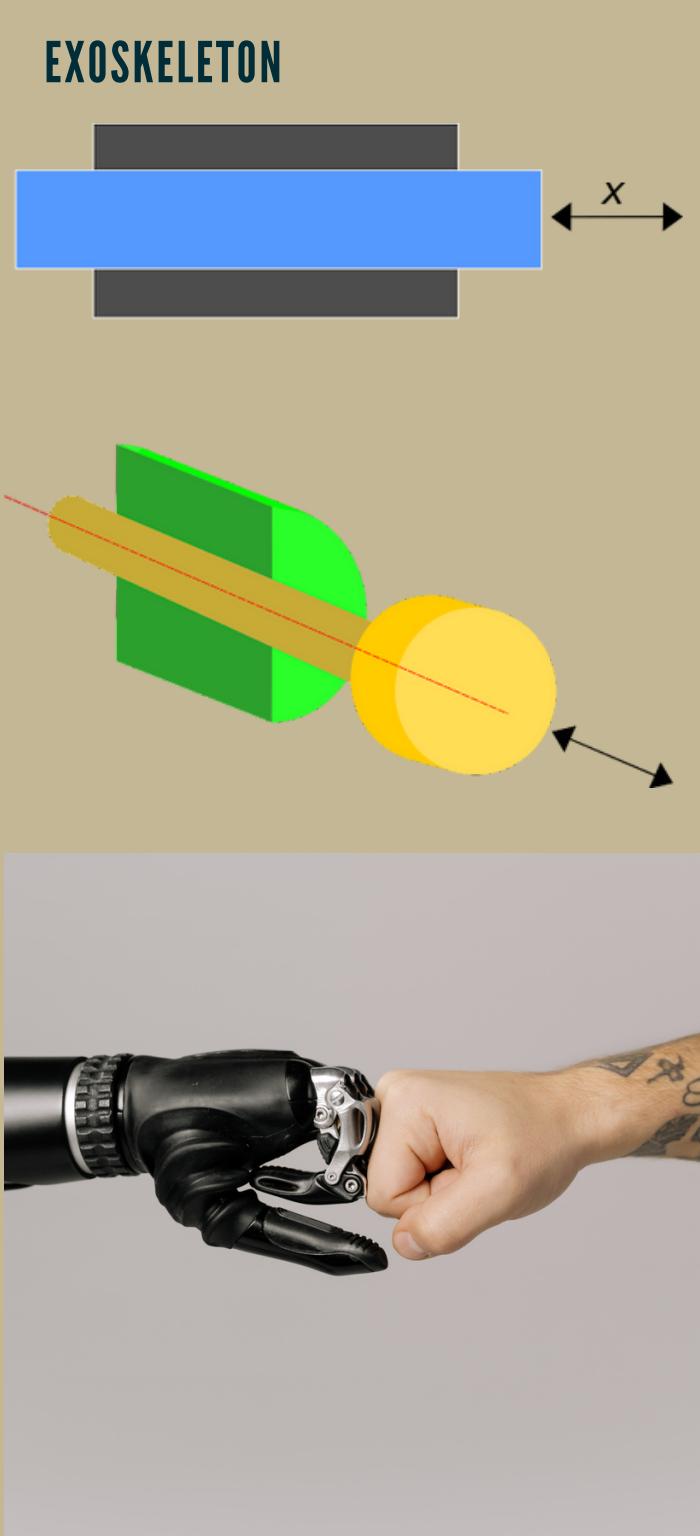
Movements Included-

1. Shoulder flexion/extension
2. Shoulder adduction/abduction
3. Elbow external-
flexion/internal-extension

**The 3-DOF upper-limb
exoskeleton -**

- performs elbow external-
flexion/internal extension.
- in the plane of the vertical
sagittal plane.





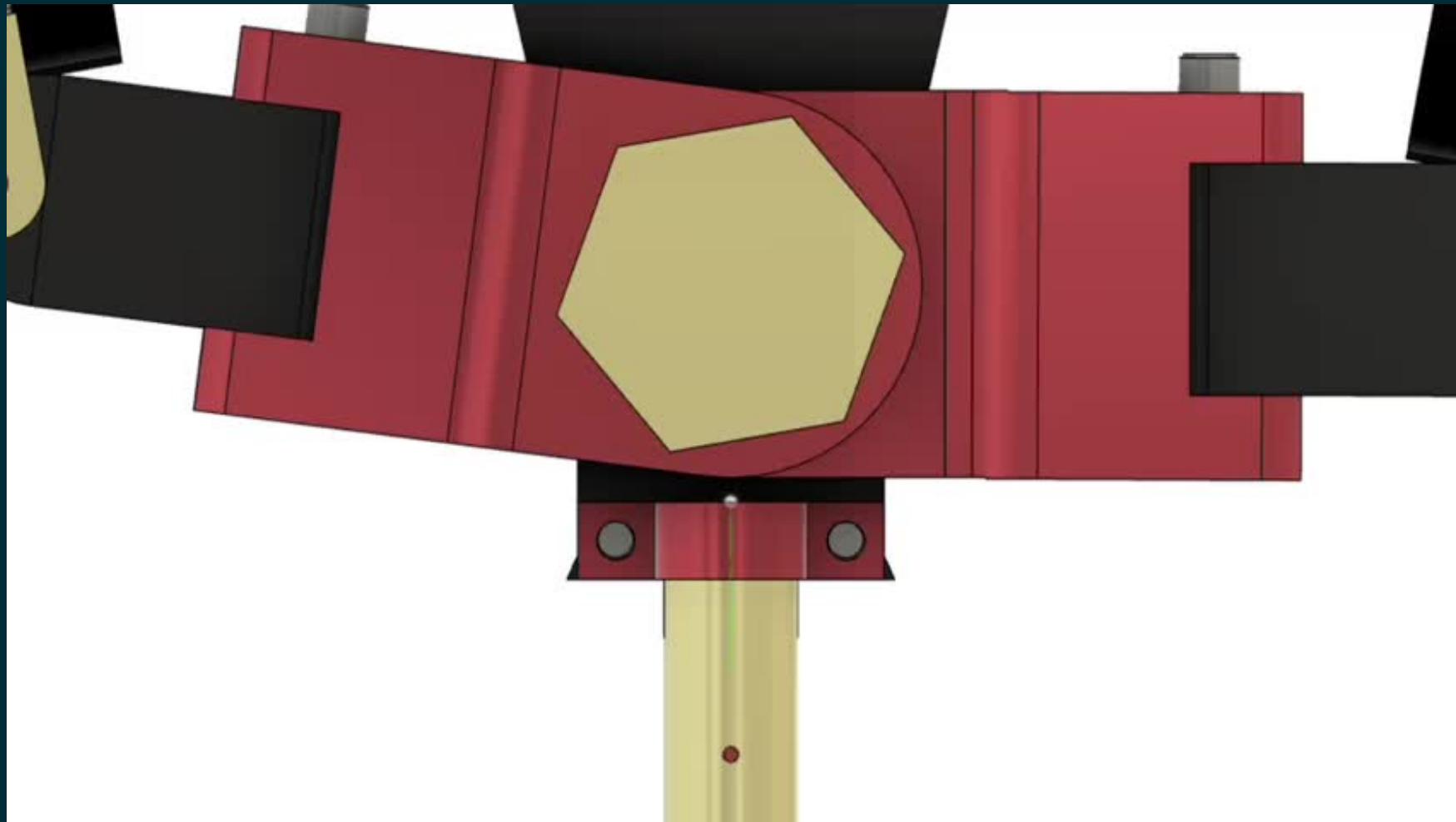
COMPONENTS OF 3-DOF

ROTARY JOINTS :

- Allows only rotary movement around a single axis.
- Three rotating joints are present

PRISMATIC JOINT :

- For vertical adjustment
- Provides a linear sliding movement
- It is used for Height adjustment



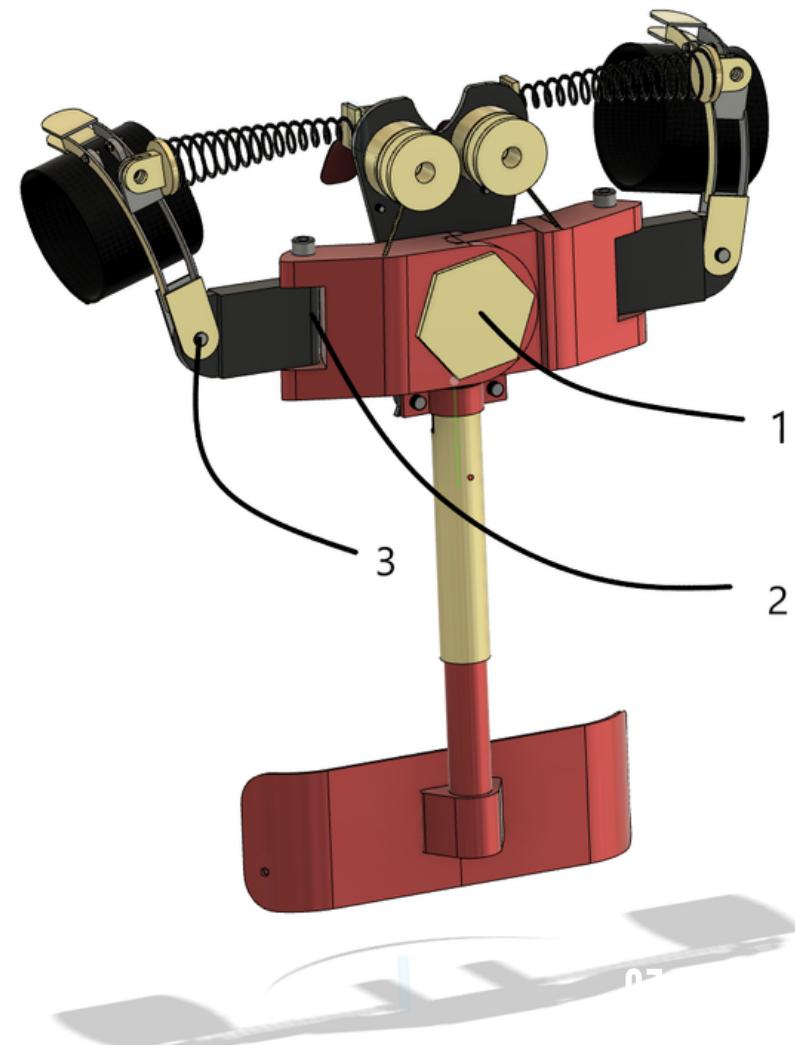
COMPONENTS

Rotary joints help in the smooth movement of the human arm in various directions.

- I. "1" - movement along the y-z plane.
- II. "2" - movement along the x-y plane.
- III. "3" - movement along the y-z plane.

BACK STRAPS:

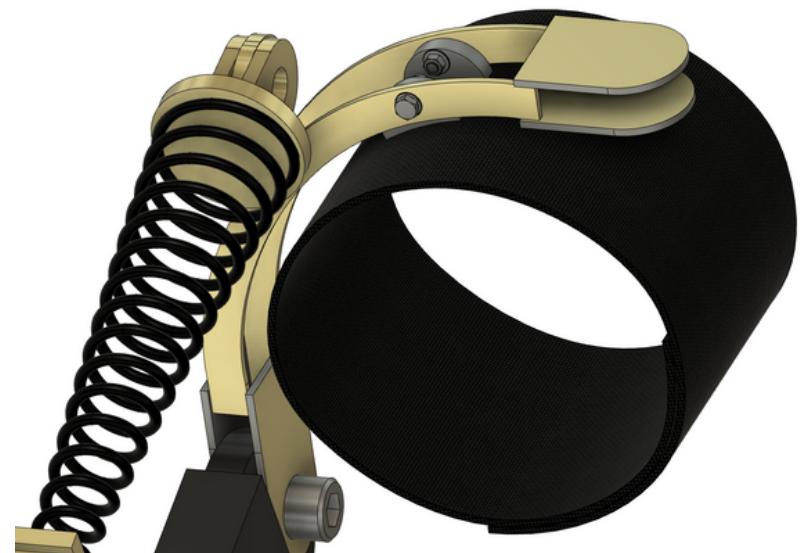
- Stable and comfort
- It makes Exoskeleton suit wearable



COMPONENTS

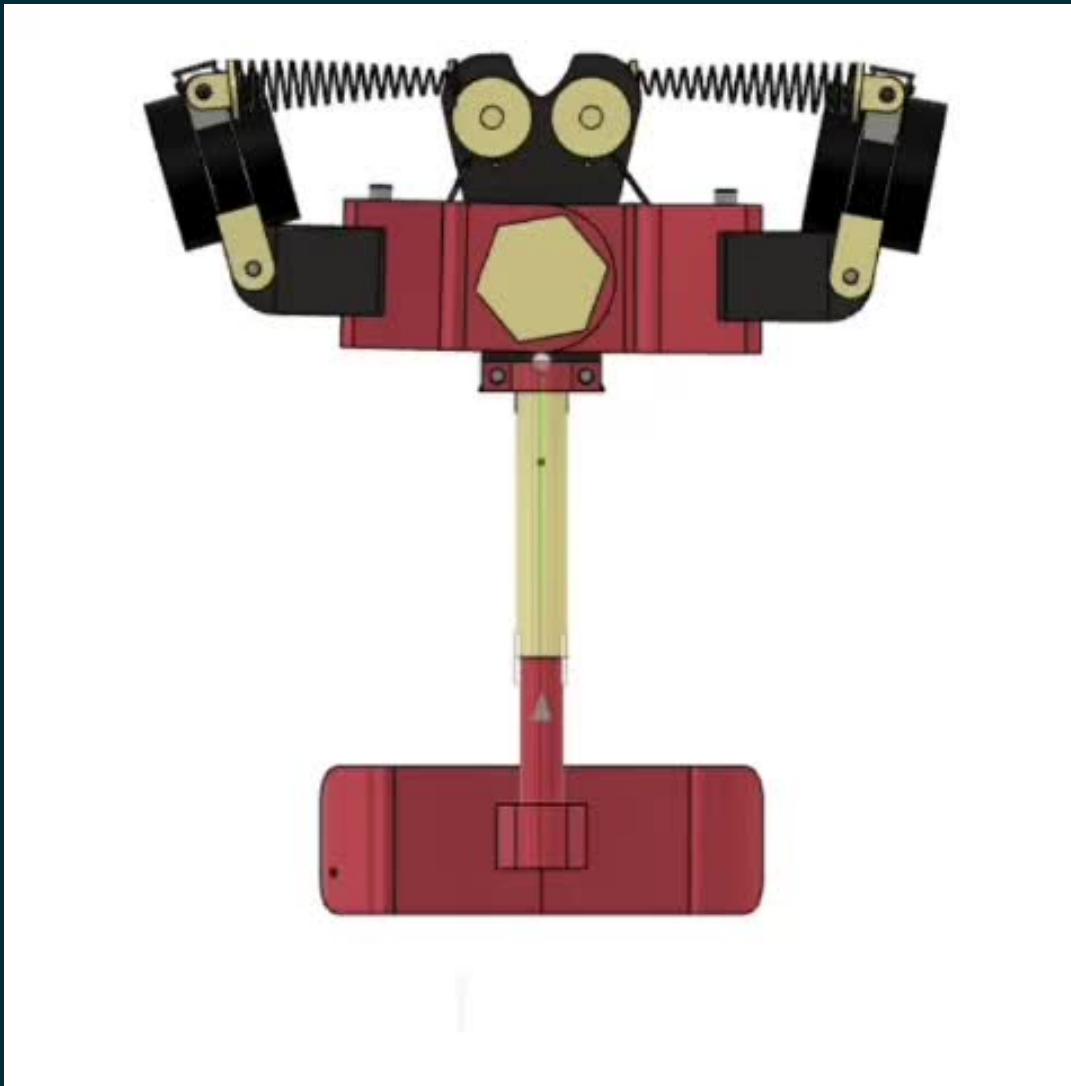
ARM CUFF :

- Improve the stability and comfort
- Reduce uncertainties caused by instabilities



BELT :

- Keep the 3-DOF
- Conveniently adjusted by the user as well



TORQUE AMPLIFICATION

Springs help **increase the torque generated by our exoskeleton** to amounts sufficient for carrying out the desired tasks.

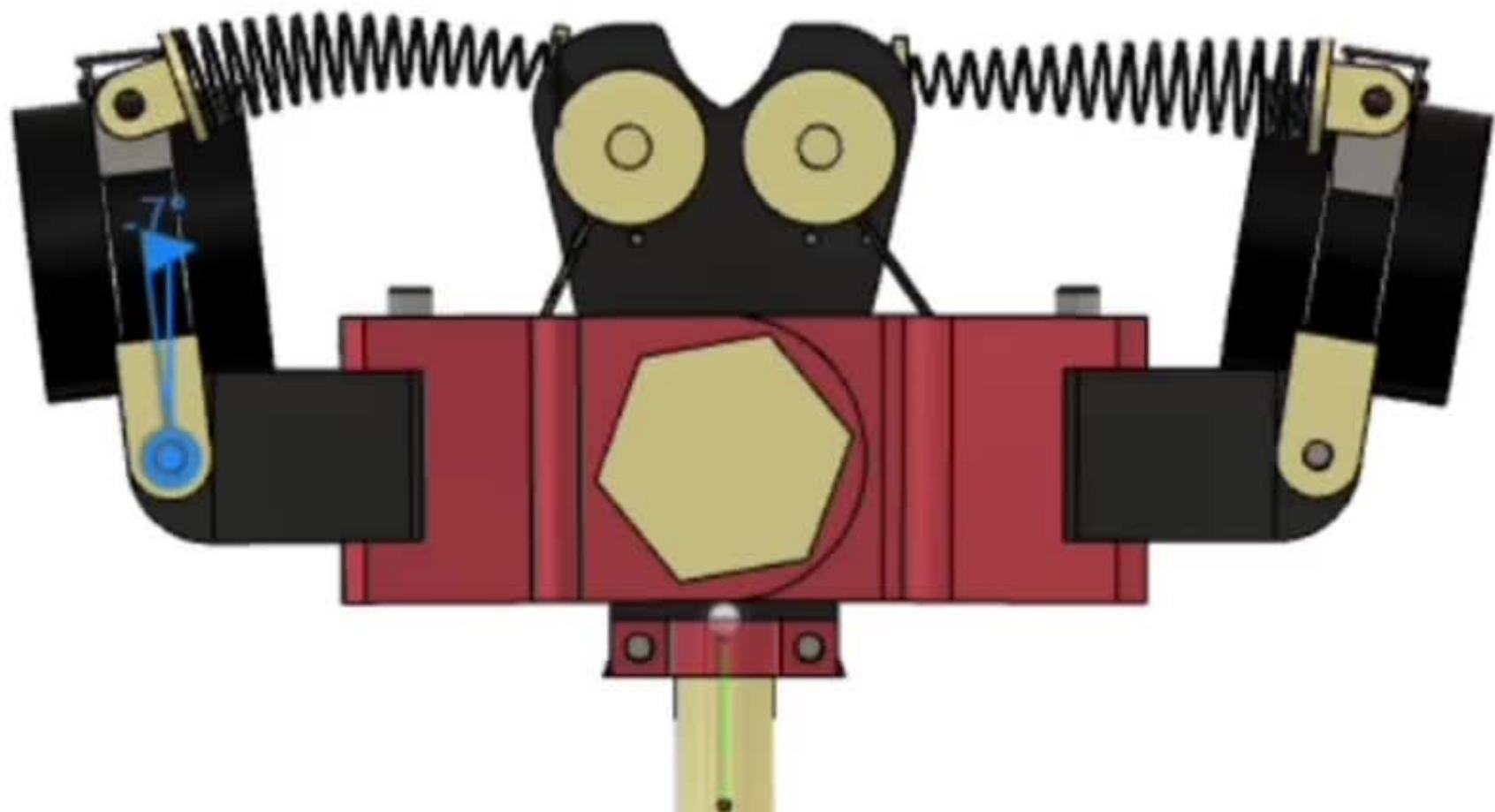
Springs used are-

TORSION SPRINGS -

- connected at the **back**
- help in torque amplification in the front plane, i.e., in the upward and downward direction with respect to the person's body.

NORMAL SPRINGS -

- connected at the **front**
- help in torque amplification in the horizontal plane, i.e., in the outward and inward direction with respect to the person's body.



FUTURE SCOPE

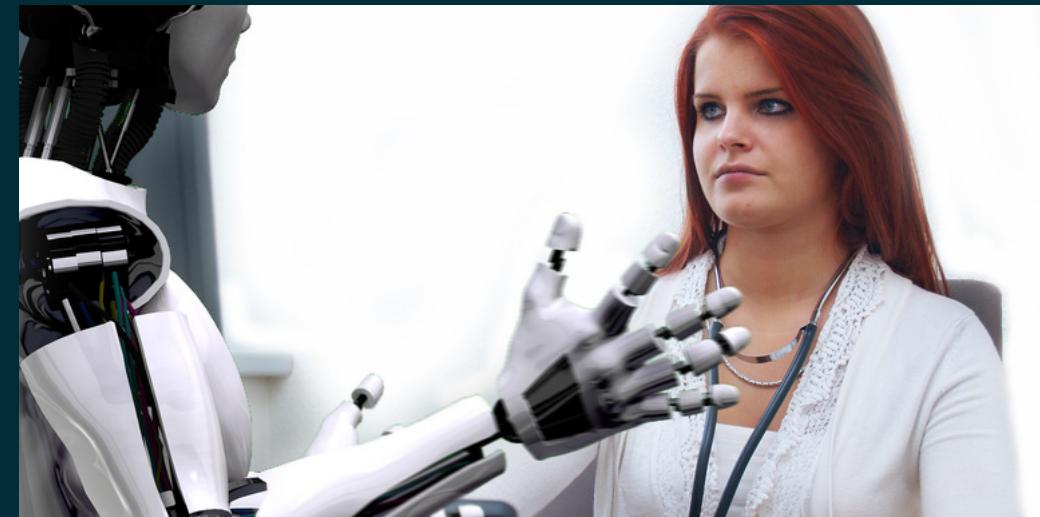
Most of the **exoskeletons currently in use are passive**.

The next step in evolving exoskeletons is to **integrate them with the Internet of Things to capture data** and provide insights to leadership teams. Eventually, exoskeletons will need to integrate with robotic arms, collaborative robots, and mobile robots through advanced location technologies, haptics, and gesture control.

The exoskeleton can be **wearable for a long time** without any issue to the wearer, **more lightweight**, and **easy to carry**.
Everyone **can afford it**.

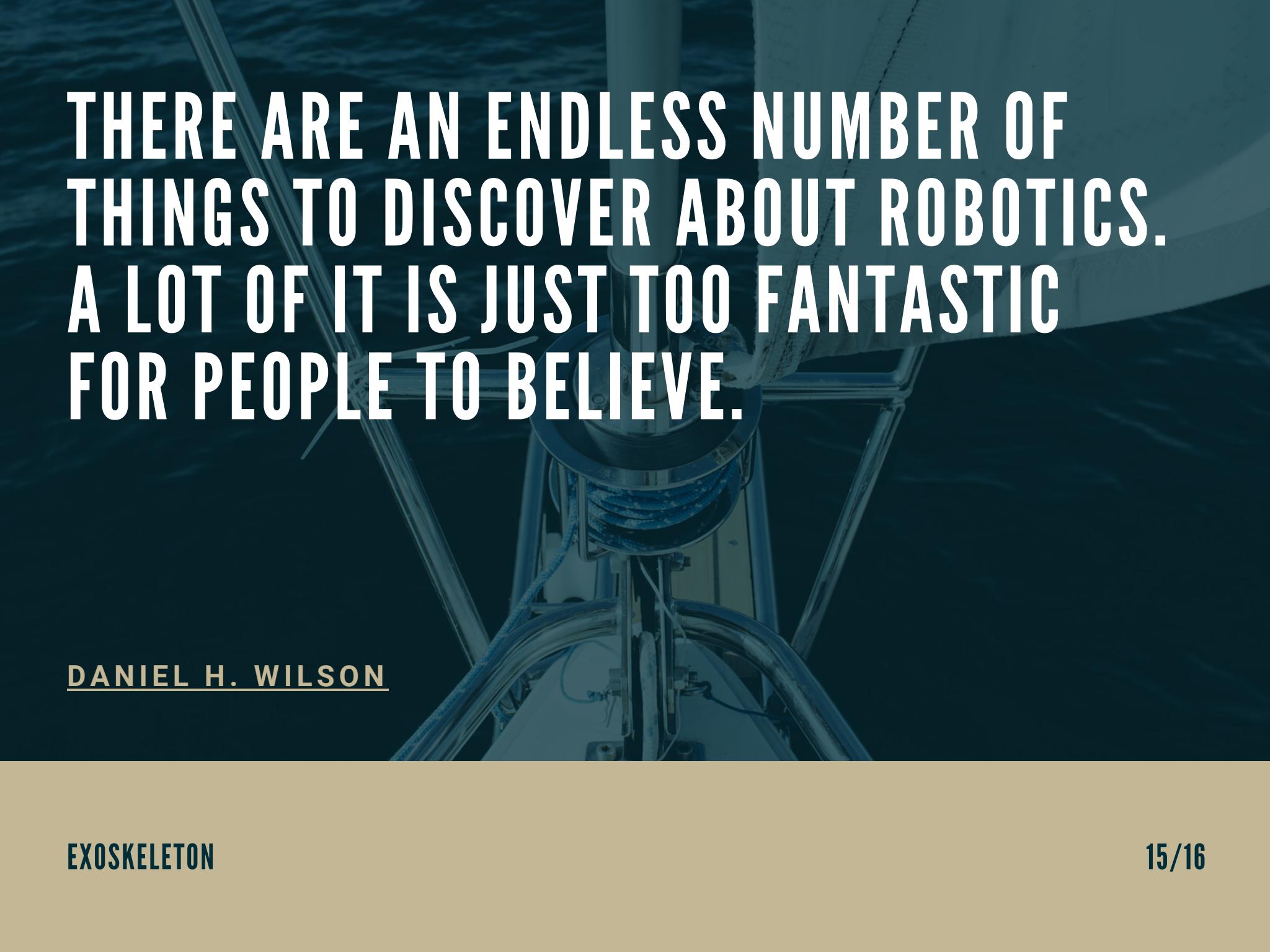
This project can be extended to whole body.

Torsion springs can be developed for pneumatic joints movement.



CONCLUSION

The idea behind this project is to develop a user-friendly system. This project shows that it is simple in construction, design and cheaper. It gives quick response ,lightweight flexible compared to heavy hydraulic exoskeletons. This can be achieved while maintaining simplicity, ease of use, implementation and maintenance. This project is not only used to lift weights but also is applicable in rescue operations, military, industries.



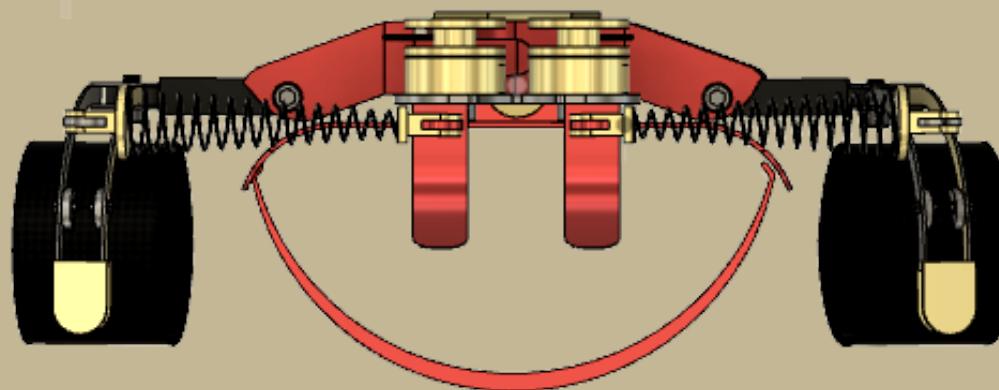
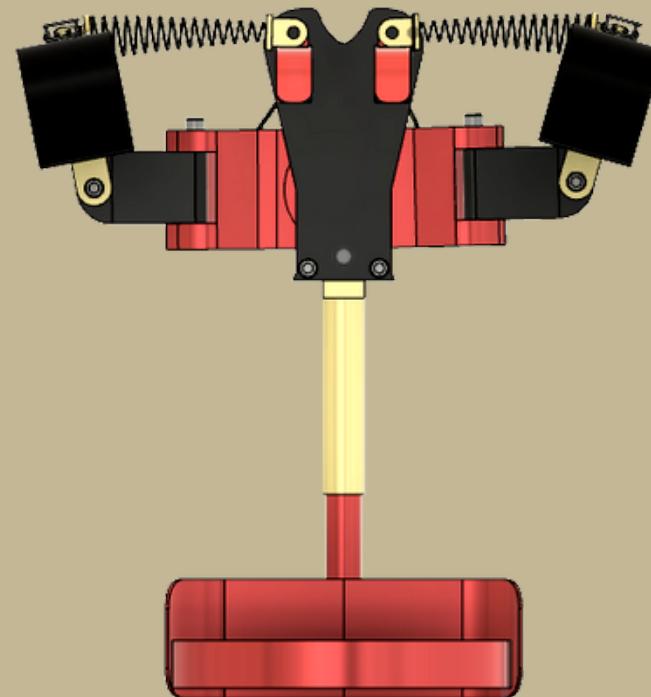
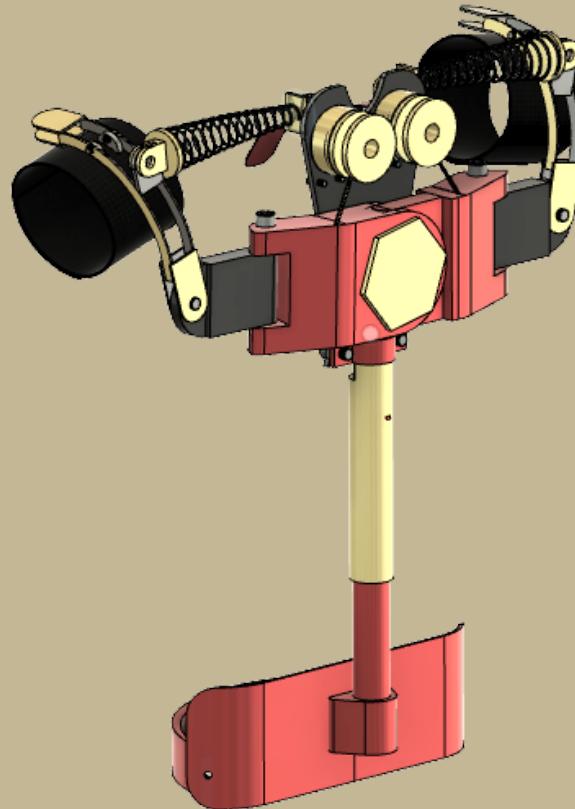
THERE ARE AN ENDLESS NUMBER OF
THINGS TO DISCOVER ABOUT ROBOTICS.
A LOT OF IT IS JUST TOO FANTASTIC
FOR PEOPLE TO BELIEVE.

DANIEL H. WILSON

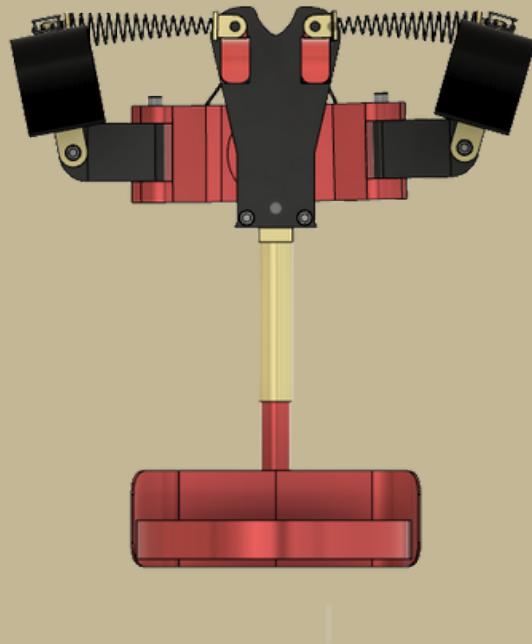
EXOSKELETON

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EXOSKELETON



EXOSKELETON





THANKS FOR
WATCHING.