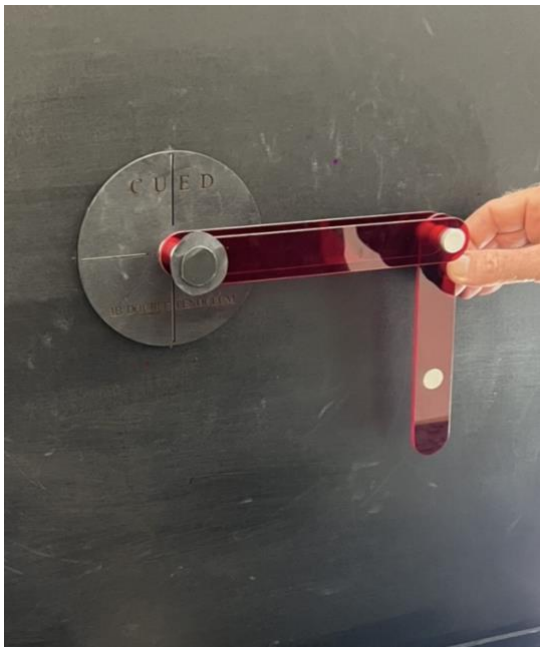
Outreach day activity- "Exploring the mechanics lab" Gemma Jacobson

I took the students around the south wing mechanics lab and showed them how to use equipment I have used in my previous lab work during my degree. It was a very hands-on session and the students seemed to really enjoy being able to test equipment themselves. My aim was to show the students how fun doing lab work can be.

Rolling objects down the slope

- Firstly I should them different objects rolling down a slope. I showed them plastic and steel cylinders and asked them which would get to the bottom faster
- I told them that Galileo once did an experiment on top of the Tower of Pisa with objects of different materials and they hit the bottom at the same time and it is the same going down the slope
- I then showed them a steel sphere and cylinder and asked the same question
- I explained to them the Moment of Inertia and that because a sphere has a smaller distribution of mass around the centre of gravity it rolls faster
- I then showed them cylinders with small ball bearings and oil inside and showed how they roll slower as energy is dissipated inside the spheres as they roll
- I then let the students test any shapes down the ramp that they wished

Double Pendulums

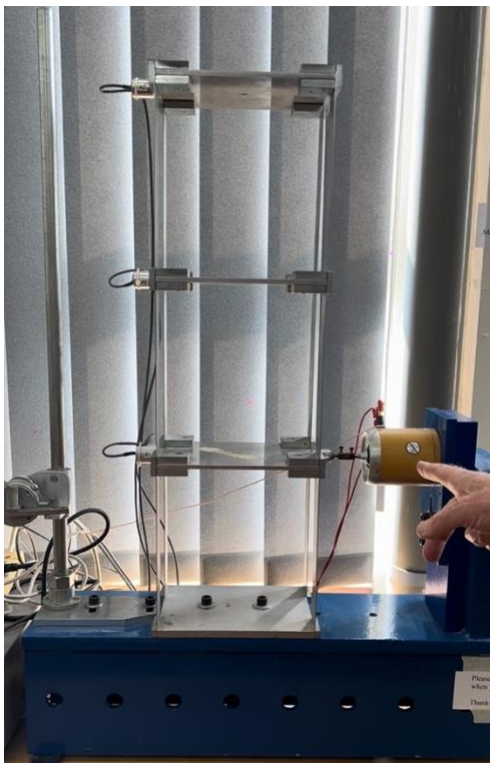


- I showed the students the double pendulums and corresponding raspberry pis and recording equipment
- I showed them that even when the pendulum is started at the same place each time the shape of the movement was always unpredictable and different each time and this was because of "chaos" in the environment
- I let the students record the movements of the pendulums themselves and test different starting positions

Gyroscopes

- I showed the students the gyroscopes before the rotor was on and whilst spinning and then again when placed on their bases and allowed them to test the movements that happen due to the gyroscopic effect
- They really liked this demonstration because the movement of the gyroscopes was so unexpected
- I showed them how to stand on a platform and tilt the gyroscope to make them spin and they thought this was really fun

Shaking structures



- I spoke to the students about what a resonant frequency is and then showed them how changing the frequency applied to a structure whilst keeping magnitude constant changed the vibrations seen
- I then let the students adjust these frequencies themselves

The zero-gravity table

- I turned on the air table which presents an environment without friction and showed them the demonstration on that table of how a planet circles the sun
- I then showed them how to test on that table the impact of collisions on a planet in circulation by using different shaped plates with represented collisions of different sizes

Overall, the activity was a success with the students all participating and actively engaging.